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ENGINEERING DESIGN FILE

EDF-096-

017

Rev. No. _____

Page 1 of 2

EDF Title: PM-2A Tank Excavation Slope Stability

Project No.: 2000-096

Project Title: OU 1-10, Group 3

Problem Statement: The excavation required to remediate the buried waste storage tanks (V-13 and V-14) in the TSF-26 area needs to be designed to provide a stable excavation. The excavation will be approximately 19 feet deep, with an 85' x 59' working surface in the bottom of the excavation. The access ramp will exit the excavation on the Northeast side.

Summary of Conclusions: 1:1 slopes shall be maintained in the excavation. Spoils piles must be maintained a minimum of 20 feet from the edge of the excavation, and no vehicular traffic shall be permitted within ten feet of the top of the slope.

Review and Approval Signatures:

		Printed Name	Signature	Date
Prepared by:		J. SHAUN DUSTIN		10-2-3
Checked by:		KEVIN SHABER		12/3/03
Approval:		GARY MECHAM		12/3/03

Distribution:

Professional Engineer's Stamp (if required)





ENGINEERING DESIGN FILE

EDF Title: PM-2A Tank Excavation Slope Stability		EDF-
Project #:	Discipline #:	Rev. No.
Project Title:		Page 1 of 2

Design Basis: The slopes must meet the requirements of CFR Title 29, Chapter XVII, Section 1926.652. Check using SNAILZ slope stability analysis package.

Assumptions: Soil is treated as homogeneous mixture with the uniform characteristics of the weakest identified layer; others as outlined in the appendices.

References: Mfg. data as incorporated. Project documents. Principles of Geotechnical Engineering (3rd ed), Braja M Das, PWS Publishing, 1995. Additional references as included in the EDF.

Calculations/Analysis: See attached calculation sheets

ENGINEERING REPORT

DESIGN OF EXCAVATION SLOPES FOR PM-2A TANK REMEDIATION

Rev 2

INTREPID Task No. 2000-096-05

2 October 2003

Prepared By: Shaun Dustin, PE

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This report was prepared under the responsible charge of a Professional Engineer as indicated by the seal and signature provided below:



1.0 Project Description

ITR has been contracted to provide an engineering design for the remediation of the PM-2A tanks at TAN. The tanks contain radioactive sludge left over from operations in building 607-B at TAN.

The purpose of this design is to determine the allowable slopes for the temporary excavation around the tanks, and to provide recommendations for the required earthwork.

2.0 Design Criteria

Dimensions: The excavation must be large enough to provide working room around the tanks as shown in the attached drawings.

The tanks are 55' long and 12.5' in diameter, (see Figure 1) with the bottoms of the tanks at an estimated elevation of 4755 ft, and the existing ground surface between 4777 and 4780 feet. The bottom of the excavation will be located at the springline of the tanks, approximately elevation 4461. For the purposes of slope stability analysis in this EDF, the maximum depth of 19 feet (4780-4761) will be used.

The excavation footprint and spoils pile locations are as shown in Figure 2. The crane used in developing the loads used in the model, a Grove GMK5240 with 97,000 lb ballast will, at the critical case, apply a load of 129,000 lbs to 8'x8' timber cribbing located at least 22 feet from the edge of the excavation. In the model, this will be treated as a distributed load on a 1 ft wide strip running from 22 feet from the edge of the excavation to 30 feet from the edge of the excavation. The perimeter fence may not be interfered with.

If any portion of the proposed work fails to comply with the assumptions stated above, the slope stability must be recalculated using the changed conditions.

3.0 Analysis Techniques

The design must meet the criteria imposed by CFR Title 29, Chapter XVII, Section 1926.652, which gives simplified procedures for determining maximum slopes for embankments depending on soil types for embankments under 20 feet, and requires design by a professional engineer for embankments over 20 feet. This excavation is 19 feet deep, and the CFR method was used. The following methodology was used to gather the required data:

Data Collection

Shaun Dustin, PE, of ITR specified the following data collection program:

Field Sampling Program:

- 1) Drill one borehole within the known fill, and a second borehole outside the known fill at the

4 TANK Steel Plating Thickness REPORTED to be 1/2"

Grove GMK5240 - Hydraulic Truck Crane 240 ton
 Gross Vehicle Weight 133,900 pounds
 Maximum Counterweights 154,300 pounds
 Outrigger Status - Extensions 100% 27'3" Spread
 Crane Rotation Status 360 degrees

			<i>Horizontal Distance - Crane to Tank</i>	<i>Lift Capacity</i>	<i>Percent Loading</i>
V-13	East Tank	80.0	h-lineal feet	53,000	49.5% 4
V-14	West Tank	100.0	h-lineal feet	36,000	72.9% 4
RUBB THA	26.2' x 65.0'	110.0	h-lineal feet	7,175	32,200 22.3% 4
Precast "C" Shape		110.0	h-lineal feet	22,728	32,200 70.6%

Long High Capacity Trailers Available ==> 2003 Fontaine Specialized TDFT Telescopic Step, Drop Decl Extendable
 102" wide / 48'-69" deck / 80,000 lbs capacity

6 TAR Coating Thickness CONFIRMED to be 1/16"

			<i>Horizontal Distance - Crane to Tank</i>	<i>Lift Capacity</i>	<i>Percent Loading</i>
V-13	East Tank	80.0	h-lineal feet	53,000	50.4% 4 & 6
V-14	West Tank	100.0	h-lineal feet	36,000	74.3% 4 & 6
RUBB THA	26.2' x 65.0'	110.0	h-lineal feet	7,175	32,200 22.3%
Precast "C" Shape		110.0	h-lineal feet	22,728	32,200 70.6%

7 TANK Steel Plating Thickness CONFIRMED to be 5/8"

Revised Crane Lift Capacity Loading ==>

			<i>Horizontal Distance - Crane to Tank</i>	<i>Lift Capacity</i>	<i>Percent Loading</i>
V-13	East Tank	80.0	h-lineal feet	53,000	63.1% 7 & 6
V-14	West Tank	100.0	h-lineal feet	36,000	92.8% 7 & 6
RUBB THA	26.2' x 65.0'	110.0	h-lineal feet	7,175	32,200 22.3%
Precast "C" Shape		110.0	h-lineal feet	22,728	32,200 70.6%

Technical Specifications for Grove Mobile Hydraulic Crane GMK6350 [350 ton crane]

<i>Boom Extension</i>	<i>Boom Distance</i>	<i>Boom Angle</i>	<i>Lift Capacity</i>	<i>Whole Tank</i>	<i>Half Tank</i>
(b-lineal feet)	(h-lineal feet)	(degrees)	(lbs)	(lbs)	(lbs)
106.0	90.0	31.9	62,000	107.8%	53.9%
124.0	100.0	36.2	51,000	131.1%	65.5%
142.0	110.0	39.2	46,000	145.3%	72.7%
151.0	120.0	37.4	40,600	164.7%	82.3%

Distance from C/L Crane to C/L of Load ==> (h-lineal feet)

Grove GMK6350 - Hydraulic Truck Crane 350 ton

			<i>Horizontal Distance - Crane to Tank</i>	<i>Lift Capacity</i>	<i>Percent Loading</i>
Gross Vehicle Weight	158,730 pounds	18.5% Delta	V-13 East Tank	90.0 h-lineal feet	62,000 53.9% 7 & 6
Maximum Counterweights	220,400 pounds	42.8% Delta	V-14 West Tank	110.0 h-lineal feet	46,000 72.7% 7 & 6
Outrigger Status - Extensions	100% 28'6" Spread	61.4% Delta Total	RUBB THA 26.2' x 65.0'	110.0 h-lineal feet	7,175 46,000 15.6%
Crane Rotation Status	360 degrees		Precast "C" Shape	110.0 h-lineal feet	22,728 46,000 49.4%

coordinates E 357317, N 795571 and E 357358, N 795604:

- a) Perform SPT tests (ASTM D-1586, AASHTO T-206) and retrieve samples at 5 ft intervals to bedrock .
- b) Have a PG or PE familiar with ASTM D-1586 and ASTM D-2488 on site during all drilling operations to recover and log samples in accordance with ASTM D-2488.

Lab Sampling Program:

- 1) Classify samples (6-10 each test depending on on-site geologist recommendations) per:
 - a) Atterberg Limits – ASTM D 4318
 - b) Particle – Size Analysis – ASTM D 422.
 - c) Moisture Content – ASTM D 2216

On-site Geologist: Boe Reynolds, Northwind Environmental, 208-528-8718, x192

Driller: Joe Lambert and Ivan Perkes, Dynatec Drilling

Drill Rig: Foremost DR-24

Sampling Equipment: Hollow stem auger; standard split spoon sampler; automatic (hydraulic) hammer.

Data Reduction

Boe Reynolds provided ITR with raw SPT results and logbooks for the work. Shaun Dustin reduced the raw SPT logs and used the reduced data used the SPT logs to produce the soil characterization. Craig Bean provided soil classifications.

The field and lab data were tabulated (see attached spreadsheet, Appendix B), and standard correlations from Principles of Geotechnical Engineering (Braja M. Das, PWS Publishing, 1994) were applied to develop inputs for the slope stability model.

The crane loads were provided by the Grove Crane Company (Appendix E), assuming a boom load of 30,000 lbs and 97,000 lbs of counterweights on a Grove GMK5240 crane with outriggers fully extended.

The preliminary slope determination was made using the criteria outlined in the CFR. SNAI, the California Transportation Department model for slope stability analysis was used to verify excavation stability.

4.0 Calculations

Design Basis: CFR 29, Chapter XVII, Section 1926.652

The laboratory data (Appendix C) classifies the material to be excavated as lean clay. The SPT results (Appendix B) indicate a minimum unconfined compressive strength of 4000 lbs/ft². Per

CFR 29, this classifies as a Class A soil, and allows a cut slope of 3/4H : 1V. I have made a conservative assumption, however, given that portions of the excavation may intercept the previously disturbed soil that was excavated during the installation of the tanks. CFR-29 requires that previously disturbed Class A soil should be treated as Class B soil, which requires a maximum slope of 1H : 1V.

Design Basis: SNAILZ Model

The SNAILZ software is a package developed by the California Department of Transportation for analysis of slopes. The following excerpt was taken from the CALTRANS website (<http://www.dot.ca.gov/hq/InfoSvcs/EngApps/>):

SNAILZ is a DOS computer program, which stands for Soil NAIL (the Z differentiates this version from a previous version of this program). This program was developed for use in stability analysis of slopes, which are reinforced with Soil Nail Retaining Walls. The program uses a bi-linear wedge analysis for failure planes existing at toe of walls and tri-linear wedge for failure planes developing below and beyond the wall toe. It is a fully balanced force equilibrium equation with only soil interslice forces included, based on a mobilized angle of internal friction and cohesion. For more information contact Shawn Wei (shawn_wei@dot.ca.gov 916-227-7142) Features of this program are:

- allows up to seven soil layers, multiple slope geometry including allowance for up to two slopes below the wall
- input of water surface (phreatic or piezometric)
- nail size and spacing can be varied
- input of an inclined external force
- input of up to two surcharges
- allows earthquake loading
- can be used for slope stability analysis with or without reinforcement
- can be used for stability analysis of tie-back walls.

Model Inputs: Input data for the model was derived from the geometric requirements for the work, and the lab and field data contained in Appendices B, C, and D as follows:

Geometric Requirements: 19 feet deep with layout as shown in Appendix A

Surcharge Loads:

- 1) Check w. 20' high spoils pile, toe of spoils pile 20' from edge of excavation, unit weight of soil = 110 lbs/ft³, slope of spoils pile = 1.5H:1V. The model also assumes a strip load of 3000 psf to account for vehicular traffic between the spoils pile and the excavation.
- 2) Check with crane surcharge located on 8'x8' timber cribbing centered 22' from edge of excavation as indicated in Appendix D. Point load of 129,000 lbs under the SW outrigger reduces to a distributed load 8 ft long under the cribbing starting 18 feet from the edge of

the excavation.

- 3) Check with crane surcharge located on 8'x8' timber cribbing centered 14' from edge of the ramp as indicated in Appendix D. Point load of 129,000 lbs under the SW outrigger reduces to a distributed load of 2015 psf 8 ft long under the cribbing starting 9.4 feet from the edge of the excavation. Excavation depth at this point is 14.3 ft

Soil Characteristics (From Appendix B):

- $N_{60\min}$: 16
- Unit weight of soil: 110 pcf
- q_u , unconfined compressive strength: 4000 psf (from Das, Table 14.3)
- c , cohesion: 2000 psf
- Angle of internal friction: 25° (Das, Table 9.3, conservative assumption)
- Water table is below failure plane
- Soil is treated as homogeneous mixture with the uniform characteristics of the weakest identified layer

5.0 Summary of Results

The maximum cut slope for any portion of the embankment is 1:1. Toe of stockpile slopes shall not be located nearer to the top of the excavation than 20 feet. No haul traffic shall be permitted within 10 feet of the edge of the excavation.

Results:

Case 1, Spoils Pile Surcharge: FS=4.17

Case 2, Crane Surcharge, main excavation: FS=5.21

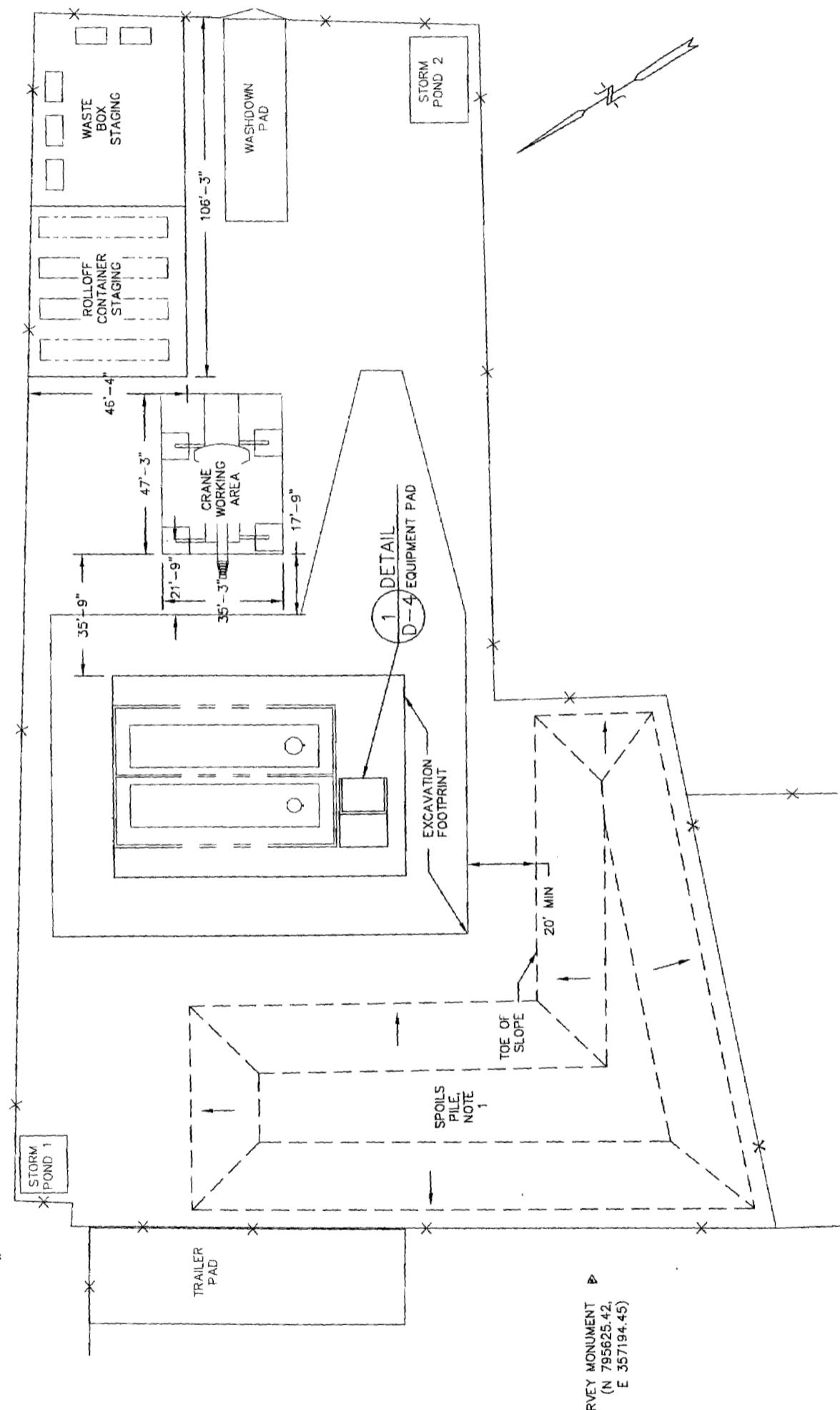
Case 3, Crane Surcharge, ramp: FS=4.68

A factor of safety of 2.5 would be acceptable. In both load cases, the CFR mandated maximum slopes provide adequate factors of safety for the work.

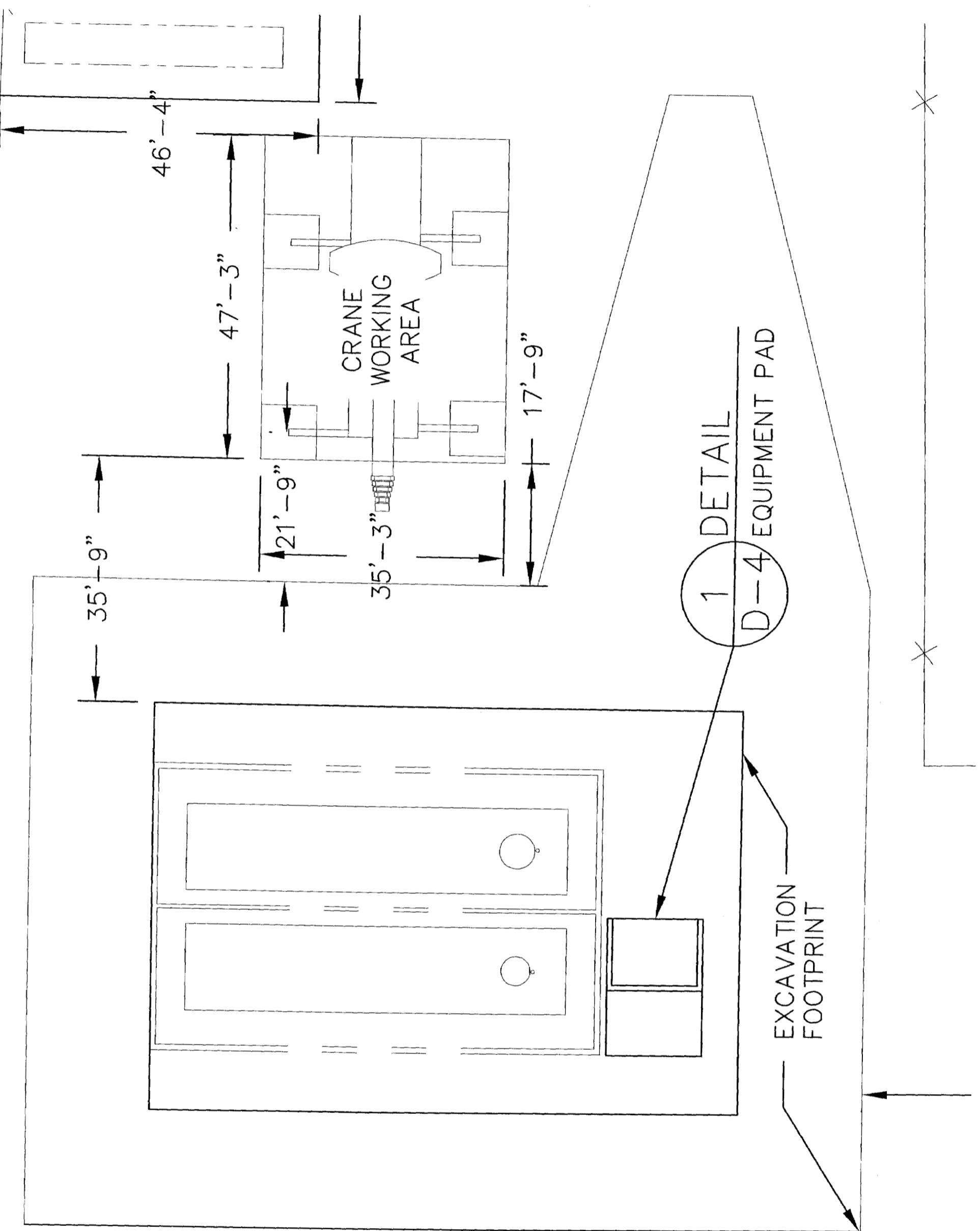
In the event that soils differing from those outlined in this design are encountered, the work should be stopped and the slopes re-evaluated on the basis of the new information.

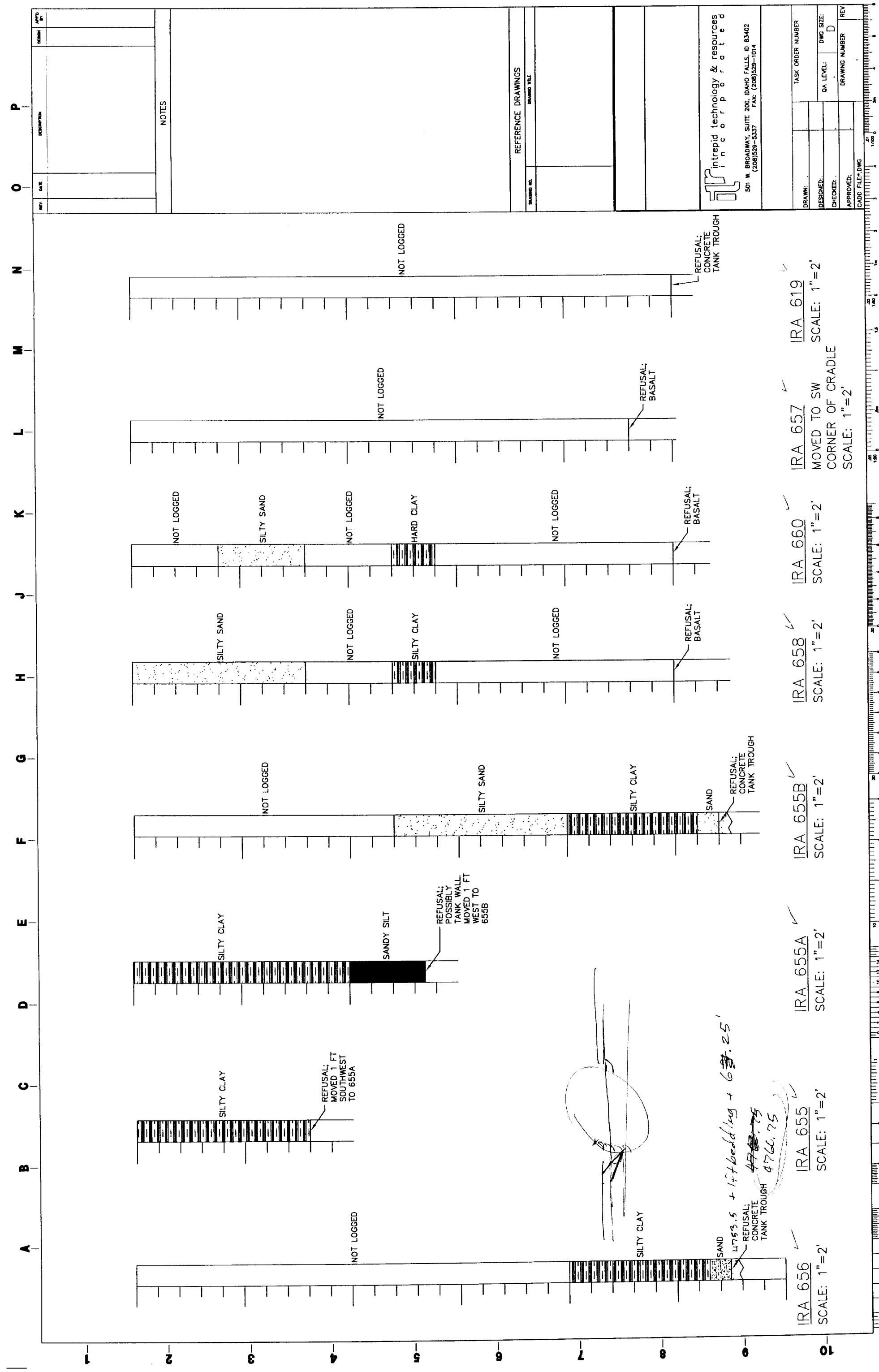
SNAILZ model output for all cases is included as Appendix F.

Appendix A: Figures



CONSTRUCTION SITE LAYOUT

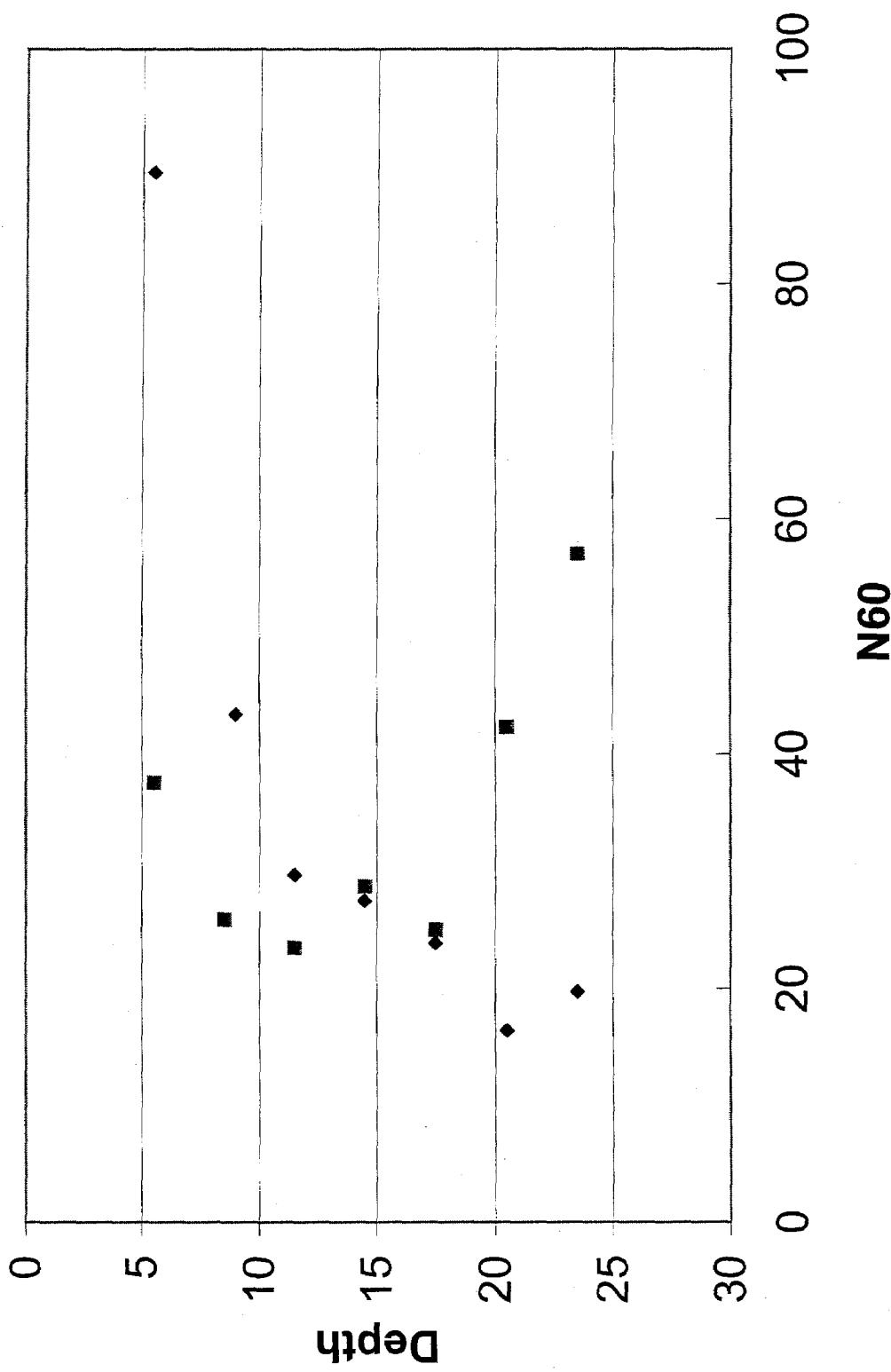




Appendix B: Field Sampling Data

Date	Borehole	Sample Interval	Blow counts	raw N-value	Depth of Overburden, h (ft)	γ , unit weight of overburden, assumed (lbs/ft ³)	Effective overburden pressure, $\sigma^2 - \gamma h / 2000$ (tons/ft ²)	Correction Factor, $C_N = (1/\sigma)^{1.5}$	Hammer Efficiency, E_m	Borehole Diameter Factor (6" borehole), C_b	Rod Length Factor, C_R	Corrected N-Value, $N60 = (E_m C_b C_R N) / (0.60)$	cohesion, $c = q_u / 2$	q_u unconfined compressive strength, lbs/ft ² from Das, Table 14.3	Angle of internal friction, degrees (from Das, Fig 9.3, assuming PI=10)	Shear Strength, s, lbs/ft ²	
4/14/2003	South	2	3	26	50	5.5	110	0.3025	1.82	0.75	1.05	0.75	89	8000	4000	30	4349
4/14/2003	South	3	3	18	31	9	110	0.495	1.42	0.75	1.05	0.75	43	8000	4000	30	4572
4/14/2003	South	4	3	14	24	11.5	110	0.6325	1.26	0.75	1.05	0.75	30	8000	4000	30	4730
4/14/2003	South	5	3	13	22	14.5	110	0.7975	1.12	0.75	1.05	0.85	27	4000	2000	30	2921
4/14/2003	South	6	3	10	21	17.5	110	0.9625	1.02	0.75	1.05	0.85	24	4000	2000	30	3111
4/14/2003	South	7	3	7	14	20.5	110	1.1275	0.94	0.75	1.05	0.95	16	4000	2000	30	3302
4/14/2003	South	8	3	12	18	23.5	110	1.2925	0.88	0.75	1.05	0.95	20	4000	2000	30	3492
4/14/2003	North	1	3	10	21	5.5	110	0.3025	1.82	0.75	1.05	0.75	38	8000	4000	30	4349
4/14/2003	North	2	3	9	18	8.5	110	0.4675	1.46	0.75	1.05	0.75	26	4000	2000	30	2540
4/14/2003	North	3	3	10	19	11.5	110	0.6325	1.26	0.75	1.05	0.75	24	4000	2000	30	2730
4/14/2003	North	4	3	13	23	14.5	110	0.7975	1.12	0.75	1.05	0.85	29	4000	2000	30	2921
4/14/2003	North	5	3	12	22	17.5	110	0.9625	1.02	0.75	1.05	0.85	25	4000	2000	30	3111
4/14/2003	North	6	3	23	36	20.5	110	1.1275	0.94	0.75	1.05	0.95	42	8000	4000	30	5302
4/14/2003	North	7	3	33	52	23.5	110	1.2925	0.88	0.75	1.05	0.95	57	8000	4000	30	5492

SPT N₆₀ Values with depth



Shaun Dustin
INTREPID

ENVIRONMENTAL RESTORATION DEPARTMENT

FIELD TEAM LEADER'S DAILY LOGBOOK

DATE START Apr 08, 20 03

DATE END _____, 20 _____

LOGBOOK NUMBER: ER - 035 - 2003

LOGBOOK ASSIGNED TO: Roger Mockli

PROJECT: RA Sampling and FS of Grp 1 sites

at WAG 1, OU 1-10

WHEN COMPLETED RETURN TO:

EMMA MCINTOSH
526-4610

OR

COREY HARRIS
526-2850

MS 3960

FIELD TEAM LEADER'S DAILY LOGBOOK

13 may 03

TSF-26 (Intrepid Work)

1300 - L. Lopez (STR) conducted pre-job briefing - Scope to complete 2 boreholes for Intrepid.

We will be collecting 18" runs every 3 ft as well as counting blows to determine a penetration test.

1335 - We will need more plastic for leapfrogging the rig to set up inside TSF-26.

1401 - L. Lopez offsite to get plastic from the lay down area.

Crew: Joe Lambert, Danny Waddoups, Ivan Perkes - Drillers, Boe Reynolds - Geologist, Lori Lopez - STR.

1430 - RAD CON onsite as well as crew. Waiting for plastic tarps.

1645 - Set up to auger / sample @ Borehole south on the berm.
Lori Lopez offsite.

1705 - Begin Augering

1707 - Augered to 1.5 ft.

1708 - getting hammer ready.

1730 - offsite Boe D. Reynolds 13 may 03

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

South Borehole

0700 Lori Lopez gives P.O.D, called Shawn Dustin and made a plan to drill down to 5 ft, then sample as regular every 3 ft.

0730 Plan of the day is to work to ASTM Standards

0805 Begin augering to 5 ft

0810 End augering / Getting hammer ready

Sample #2	Blow Counts	Start ^{Time}	Stop	Refusal @
6"	12	0822	0823	
12"	24	0824	0825	
18"	26	0825	0826	-
Total	50			

% recovery - 100%

moisture Content - Dry - slightly moist

composition - silty sand & clay SC-SM

color - greish brown

condition - Good

stratification - uniform.

Refusal depth - None

End depth - 6.5 ft start depth - 5 ft

0830 - pulling sample

0845 - augered to 8 ft to begin Sample #3

FIELD TEAM LEADER'S DAILY LOGBOOK

Sample #3	Blow Count	start	Time	End
8-9.5 ft attempt 6"	8	0905	0906	
12"	13	0906	0907	
18"	18	0907	0907:30	
(N value)	N-11	31		

% recovery - 100%

moisture content - slightly moist

composition - silty sand & clay SC-SM

stratification - uniform

refusal depth - none

end depth - 9' 11"

start depth - 8' 5"

Note: The hammer wasn't working right so we will start over from 8' 5"

0930 Augered to 11 ft, begin to set up for sample

Sample #4	Blow Count	start	Time	End
6"	6	0937	0937:30	
12"	10	0938	0938:30	
N-value - 24	18"	0939	0940	1/2 in. too far

% recovery - 75%

moisture content - slightly moist

stratification - uniform, silty sand & clay

refusal depth - none

start depth / end depth - 11 ft / 12.5 ft

0955 - augered to 14 ft.

FIELD TEAM LEADER'S DAILY LOGBOOK

13 MAY 03 (accidental skip of page)

Sample #/ or firm <small>13 may 03</small>	Blow Counts	Start	Stop
6"	16	1622	<small>OR 13 May 03</small> ft 1624
12"	31 blows went 1.5"	1625	1628 (hit refusal)
18"			
N-value	31 blows		
% recovery	- 7.5"/7.5" (100%)		
moisture content	- Dry		
composition	- Silty Sand & clay		
color	- Grayish brown		
condition	- contains < 5% rusted metal flakes		
stratification	- unified		
Refusal @	- 7.5"		
End depth	- 2 1/2"		

1700 - RAD CON surveyed all of equipment out.

We are headed to survey rad con out OR 13 May 03

Get off RWP.

1730 - offsite Bar Pyrlds 13 May 03

BR
13 May 03

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

continued from page 23

Sample #5	Blow Count	Start Time	Stop
6	5	1004	1004
12	9	1004	1005
18	13	1005	1006
N-value			22

% recovery - 90%

moisture content - slightly moist

composition - fine grained sand 2" layer of clay at 6 15"

color - brown to gray

condition - good

stratification - 0-10" - Fine Sand, 10"-15" - clay, 15-18" - FS

Refusal depth - none

start/end depth - 14 ft / 15.5 ft

1030 anchored to 17 ft, broke the wireline

and now waiting for crimper's crimp, continue @ 1055

Sample #6	Blow Count	start Time	stop
6"	6	1120	1120
12"	11	1121	1121
18"	10	1122	1122
N-value			21

% recovery - 100% | condition - good

moisture Content - slightly moist | stratification - silty sand to coarse sand

Color - light Brown - gg | start/end depth - 17 ft / 18.5

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

1140 Sampled #6, augered to 20 ft.

Sample #7	Blow count	start	time	stop
6"	10	1143		1144
12"	7	1144		1144
18"	7	1144		1145

% recovery = 100%

moisture content = moist - slightly moist

composition = 0-12" is medium grained sand, 12-18" silty sand/clay

color = light brownish grey

condition = good

stratification = 0-12" loose sand, 12-18" silty sand/clay

start / end depth = 20 ft / 21.5 ft.

1320 Inserting split spoon after 20 minute lunch break.

Sample #8	Blow Count	start	time	end
6"	6	1320		-
12"	6	1321		-
18"	12	1326		1327

% recovery = 100% moisture content = moist

composition = see stratigraphy, pebble sized basalt clasts in bottom 2" $\frac{1}{2}$ "

color = medium brown & grey condition = fresh.

Strat = 0-12" is fine sand Start/End depth = 23 / 24.5

12-18" is silt, clay, sand, calcite.

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

1345 - Augered to 26' 10" and hit basalt. We will move to the next hole and start again.

1435 - Setting up on Borehole North #2

We will auger to 5 feet then begin sampling sequence.

1450 - drilled to 5 ft, will begin penetration test

Sample #1	Blow Counts	start	End
6	9	1504	1505
12	11	1505	1506
18	10	1506	1507
N-value	21		

% recovery - 100%

composition - Mostly silty sand & clay sc-sm w/small coar
grains of calcite

color - medium brownish grey

stratigraphy - uniform

moisture content - dry - slightly moist

condition - solidified & hard (sticky)

Start/End depth - 5 / 6.5 ft

Note: Bob Sutherland was onsite from 0830 to 1030 to survey in all holes. It turns out we missed a native soil sample in TSF-2C TPA 554 and a hole in TSF-06 (Pipe access line to 15 ft). No word as to response action from Mark Eliot.

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

1515 Augered to 8 ft to begin penetration test.

Sample #	blow count	start	end
6"	6	1523	1523
12"	9	1524	1524
18"	9	1525	1525
<i>N</i> -value		18	

% recovery - 100%

moisture content - Slight to moist

composition - silt & clay [SC]

stratigraphy - uniform

color - medium to dark brown

condition - moderate to high plasticity

start/end depth - 8 ft / 9.5 ft

1535 augered to 11 ft to begin penetration test

Sample #	Blow Count	start	end
6"	6	1545	1545
12"	9	1546	1547
18"	10	1547	1548
<i>N</i> -value		19	

% recovery - 90% moisture content - dry - slightly moist

stratigraphy - uniform color - medium brown

condition - low plasticity Start/end depth - 11 ft / 12.5 ft

composition - clay & silt w/ a few wood debris

FIELD TEAM LEADER'S DAILY LOGBOOK

14 May 03

1555 augered to 14 ft to begin penetration test

Sample #4	Blow Count	Start	End
6	7	1606	1607
12	10	1607	1608
18	13	1608	1609
N-value			23

% recovery - 100 %

moisture content - somewhat moist

composition - mostly silty sand & clay, some pebble sized clasts

stratigraphy - pebble sized clasts (15%) from 12-14^{ft}

color - brownish grey

condition - low to moderate plasticity

start/End depth - 14 - 15.5 ft

1620 - augered to 17 ft to begin next sample

Sample #5	Blow Count	Start	End
6	8	1625	1626
12	10	1626	1626
18	12	1627	1627
N-value			22

% recovery - 100 moisture - slightly moist

stratigraphy - gravel in bottom color - medium Brown

condition - low-mod plasticity Start/End depth - 17 / 18.5 ft

composition - silty sand and clay from 0- 12 inches & 12 inches -

18 inches contains pebble sized clasts moderately rounded sedimentary rocks. Caliche present.

FIELD TEAM LEADER'S DAILY LOGBOOK

14 may 03

1635 - Shutting down for the day & surveying samples out.

1645 - Getting off RWF

1730 - offsite back to RWF

~~14 May 03~~

FIELD TEAM LEADER'S DAILY LOGBOOK

15 may 03

0700 L. Lopez gives POD. crew is
Same as yesterday. Joe Lambert drilling,
Ivan Perkes helping. Boe Reynolds Geologist/FTZ.

0730 All personnel is onsite for work to finish
ground penetration. RWP is in check.
we are on North Borehole #2.

c805 augered down to 20 ft

Sample #6	Blow Count	start	End
6"	7	0812	0812
12"	13	0813	0813
18"	23	0814	0815
N-Value	36		

% recovery - 75%

moisture content - moist

composition - 0-6" was fine-med grained sand, 6-18" is silt/clay

stratigraphy - change from sand to clay @ 6".

color - Brown (dark) to medium grey

condition - high plasticity in clay, low in sand.

start / end depth - 20 / 21.5 ft

0835 augered to 23 ft to begin penetration test.

BR 15' mud 23'

FIELD TEAM LEADER'S DAILY LOGBOOK

15 May 03

Sample #	Blow Count	start	end
15 May 03	11	0847	0848
6 "	19	0848	0849
18 "	33	0849	0850
N-value		52	

% recovery - 75%

moisture content - moist

composition - 0-6" & 12-18" are SC, 6-12" is fine sand.

color - dark Brown

condition - High Plasticity in silt/clay, sand is loose

stratigraphy - sand from 23.5 to 24 ft

start/end depth - 23 / 24.5 ft

0915 anchored to basalt @ 24.6 ft.

1115 Jon Ely (RTC) is checking smears after working to survey the rig out of the zone.

1200 All personnel is off RWP and breaking for lunch.

1230 Drillers have gotten everything out of the zone. They will clean up around the site and leave.

Note: WGS is taking care of RAD waste as well as cold waste.

Intrepid (North #2 Bore Hole):

<u>Sample/ Interval</u>	<u>Date</u>	<u>Interval (in)</u>	<u>Blow Counts</u>	<u>Material</u>	<u>Recovery (%)</u>	<u>Moisture</u>	<u>Start</u>	<u>Stop</u>	<u>Comments:</u>
1	14-May-03	0-6	9	Silty sand & clay (SC-SM)	100	Dry	1504	1505	
5' - 6.5'		6-12	11	Silty sand & clay (SC-SM)	100	Slightly moist	1505	1506	
		12-18	10	Silty sand & clay (SC-SM)	100	Slightly moist	1506	1507	
		n-value	21						
2	14-May-03	0-6	6	Silty sand & clay (SC)	100	Dry	1523	1523	
8' - 9.5'		6-12	9	Silty sand & clay (SC)	100	Slightly moist	1524	1524	
		12-18	9	Silty sand & clay (SC)	100	Slightly moist	1525	1525	
		n-value	18						
3	14-May-03	0-6	6	Silty sand, clay & wood debris	90	Dry	1545	1545	
11' - 10.5'		6-12	9	Silty sand, clay & wood debris	90	Slightly moist	1546	1547	
		12-18	10	Silty sand, clay & wood debris	90	Slightly moist	1547	1548	
		n-value	19						
4	14-May-03	0-6	7	Silty sand, clay & some pebbles	100	Dry	1606	1607	
14' - 15.5'		6-12	10	Silty sand, clay & some pebbles	100	Slightly moist	1607	1608	
		12-18	13	Silty sand, clay & some pebbles	100	Slightly moist	1608	1609	
		n-value	23						
5	14-May-03	0-6	8	Silty sand & clay (SC)	100	Dry	1625	1626	
17' - 18.5'		6-12	10	Silty sand & clay (SC)	100	Slightly moist	1626	1626	
		12-18	12	Silty sand, clay & some pebbles	100	Slightly moist	1627	1627	
		n-value	22						
6	15-May-03	0-6	7	Sand, fine-grained	75	Dry	0812	0812	
20' - 21.5'		6-12	13	Silty sand & clay (SC)	75	Slightly moist	0813	0813	
		12-18	23	Silty sand & clay (SC)	75	Slightly moist	0814	0814	
		n-value	36						
7	15-May-03	0-6	11	Silty sand & clay (SC)	75	Dry	0847	0848	
23' - 24.5'		6-12	19	Sand, fine-grained	75	Slightly moist	0848	0849	
		12-18	33	Silty sand, clay & some pebbles	75	Slightly moist	0849	0850	
		n-value	52						

Intrepid (South Bore Hole):

Sample/ Interval	Date	Interval (in)	Blow Counts	Material	Recovery (%)		Moisture	Start	Stop	Comments:
					100	100				
1 1.5' - 2' 1.5"	13-May-03	0-6 6-12 12-18	16 31 n-value	Silty sand & clay (SC) Silty sand & clay (SC)	100 100	Dry Dry	Dry	1622 1625	1624 1628	Refusal at 7.5 in.
2 5 - 6.5'	14-May-03	0-6 6-12 12-18 n-value	12 24 26 50	Silty sand & clay (SC-SM) Silty sand & clay (SC-SM) Silty sand & clay (SC-SM)	100 100 100	Dry Slightly moist Slightly moist	Dry	0822 0824 0825	0823 0824 0826	
3 8.5 - 9' 11"	14-May-03	0-6 6-12 12-18 n-value	8 13 18 31	Silty sand & clay (SC-SM) Silty sand & clay (SC-SM) Silty sand & clay (SC-SM)	100 100 100	Dry Slightly moist Slightly moist	Dry	0905 0906 0907	0906 0907 0908	
4 11 - 12.5'	14-May-03	0-6 6-12 12-18 n-value	6 10 14 24	Silty sand & clay (SC-SM) Silty sand & clay (SC-SM) Silty sand & clay (SC-SM)	75 75 75	Slightly moist Slightly moist Slightly moist	Dry	0937 0938 0939 0940	0938 0939 0939 0940	
5 14 - 15.5'	14-May-03	0-6 6-12 12-18 n-value	5 9 13 22	Sand, fine-grained Sand, fine-grained Sand, fine-grained	90 90 90	Slightly moist Slightly moist Slightly moist	Dry	1004 1005 1006	1004 1005 1006	
6 17 - 18.5'	14-May-03	0-6 6-12 12-18 n-value	6 11 10 21	Silty sand to coarse gravel (SC-GM) Silty sand to coarse gravel (SC-GM) Silty sand to coarse gravel (SC-GM)	100 100 100	Slightly moist Slightly moist Slightly moist	Dry	1120 1121 1122	1120 1121 1122	
7 20 - 21.5'	14-May-03	0-6 6-12 12-18 n-value	10 7 7 14	Sand, medium-grained Sand, medium-grained Silty sand & clay (SC-SM)	100 100 100	Dry Slightly moist Slightly moist	Dry	1143 1144 1144	1144 1144 1145	

Intrepid (South Bore Hole):					
<u>Sample/ Interval</u>	<u>Date</u>	<u>Interval (in)</u>	<u>Blow Counts</u>	<u>Material</u>	<u>Recovery (%)</u>
8	14-May-03	0-6	6	Sand, fine and medium-grained	100
23 - 24.5'		6-12	6	Sand, fine and medium-grained	100
		12-18	12	Silt, sand, clay and caliche	100
		n-value	18		

Comments:

Appendix C: Lab Data

INTEROFFICE MEMORANDUM

Date: June 11, 2003

To: Kathleen A. Otter MS 3960 6-5405

From: H. Craig Bean *HCB* MS 4136 6-9941

Subject: LETTER OF TRANSMITTAL

This letter is to document the transmittal of the soil testing data and final report in support of the testing conducted by the INEEL Materials Test Lab on soil samples from the TAN/TSF (06-26) Group 1 soil characterization. The testing was conducted in accordance with ER-SOW-434.

HCB:snh

Enclosures

cc: H. Craig Bean Letter File

R E C E I V E D
JUN 11 2003 D

Uniform File Code: 7101

UNQUALIFIED/UNVALIDATED DATA

Disposition Authority: ENV5-d

Retention Schedule: Destroy when 10 years old.

NOTE: Original disposition authority, retention schedule, and Uniform Filing Code applied by the sender may not be appropriate for all recipients. Make adjustments as needed.

MATERIALS TEST LAB M&TE LOG

MONTH OF: Jun-03

Test Equipment	Equip. ID #	Lab Log #	Cal. Due Date	Project	Remarks
1" sieve	720250		6/6/04		
3/4" sieve	720249		6/6/04		
1/2" sieve	720248		6/6/04		
3/8" sieve	720247		6/6/04		
1/4" sieve	720246		6/6/04		
# 4 sieve	720245		6/6/04		
# 8 sieve	720244		6/6/04		
TAN/TSF					
# 10 sieve	720243	Lab Log #019 thru 033	6/6/04	06-26	
# 16 sieve	720242		6/6/04		
# 30 sieve	720241		6/6/04		
# 40 sieve	720237		6/6/04		
# 50 sieve	720236		6/6/04		
# 100 sieve	720235		6/6/04		
# 200 sieve	720234		6/6/04		
#200 deep sieve	720233		6/6/04		
#200 deep sieve	720232		6/6/04		
3" sieve (tray)	703751		12/9/03		
2" sieve (tray)	703754		12/9/03		
1" sieve (tray)	703750		12/9/03		
3/4" sieve (tray)	703752		12/9/03		
1/2" sieve (tray)	703755		12/9/03		
3/8" sieve (tray)	703749		12/9/03		
#4 sieve (tray)	703753		12/17/03		
# 8 sieve (tray)	706667		12/17/03		

1" sieve	703454		12/17/03	TAN/TSF
3/4" sieve	703456	Lab Log #019 thru 033	12/17/03	06-26
1/2" sieve	703457	Lab Log #019 thru 033	12/17/03	06-26
3/8" sieve	703455	Lab Log #019 thru 033	12/17/03	06-26
# 4 sieve	703279	Lab Log #019 thru 033	2/3/04	06-26
# 8 sieve	703361	Lab Log #019 thru 033	2/3/04	06-26
# 10 sieve	703362	Lab Log #019 thru 033	12/17/03	06-26
# 16 sieve	703363	Lab Log #019 thru 033	2/3/04	06-26
# 30 sieve	703364	Lab Log #019 thru 033	2/3/04	06-26
# 40 sieve	703365	Lab Log #019 thru 033	12/17/03	06-26
# 50 sieve	703366	Lab Log #019 thru 033	2/3/04	06-26
# 100 sieve	703367	Lab Log #019 thru 033	2/3/04	06-26
# 200 sieve	703368	Lab Log #019 thru 033	2/3/04	06-26
# 200 deep sieve	706530	Lab Log #019 thru 033	12/17/03	06-26
# 100 sieve (new)	703360		12/17/03	
# 200 sieve (new)	703359		12/17/03	
Elec. Balance	720633	Lab Log #019 thru 033	8/13/03	TAN/TSF 06-26
Elec. Balance	719957	Lab Log #019 thru 033	10/22/03	TAN/TSF 06-26
Elec. Balance	719914		10/23/03	
Elec. Balance	707776		5/27/04	
Mech. Scale	707777		6/27/03	
Mech. Scale	720632		8/13/03	
Beam Balance	706705		12/18/03	
Beam Balance	705678		12/18/03	
Beam Balance	705075		5/22/04	
Beam Balance	705072		8/1/03	
Beam Balance	702162		5/15/03	

Vernier Caliper	720445		6/12/03
Vernier Caliper	703266		6/17/04
Dial Caliper	720312		11/4/03
Digital Caliper	720325		11/13/03
PI Tape	715496		8/29/03
PI Tape	715497		8/29/03
Micrometer 5-6"	709729		8/8/03
Depth Micro.	705071		1/28/04
Micrometer 0-1"	704875		6/28/04
Height Gage	703268		5/7/04
Straight Edge	703267		6/12/03
Multimeter	715154		1/30/04
Level	705073		10/16/03
Dial Gage	720744		3/12/03
Dial Gage	711839		6/17/04
Dial Gage	711769		3/5/04
Dial Gage	711699		3/5/04
Dial Gage	711698		3/5/04
Dial Gage	711697		6/18/03
Dial Gage	703747		3/5/04
Dial Gage	703748		3/5/04
Glass Therm.	720012		11/1/03
Glass Therm.	720011		11/1/03
Glass Therm.	720010		11/1/03
Glass Therm.	720009		11/1/03
Glass Therm.	720008	Lab Log #019 thru 033	TAN/TSF 11/1/03 06-26
Dial Therm.	712471		5/30/04
Dial Therm.	705115		12/8/03
Dial Therm.	712453		9/26/04
Dial Therm.	712452		5/30/04
Dial Therm.	720775		9/26/03
Dial Therm.	710183		5/25/03
Recording Therm.	703959		9/30/03
Digital Therm.	720513		8/27/03

Tinius-Olsen	267216		6/2/04
Extensometer	710474		11/19/03
Capping Plate	703356		8/31/03
Capping Plate	703231		5/10/03
Capping Plate	717092		11/10/03
Slump Cone	710738		5/15/05
Slump Cone	721033		3/18/04
Slump Cone	721169		4/4/05
Slump Cone	721034		3/18/04
Slump Cone	708984		4/14/05
Air M gages	717090		2/3/04
Air M gages	717091		2/3/04
Air M gages	712545		2/3/04
Air M gages	712544		11/1/04
Air M gages	712473		2/3/04

TAN/TSF				
Soil Oven	707768	Lab Log #019 thru 033	1/19/04	06-26
Blue M Oven	224480		11/6/03	
Proving Ring	703230		1/1/04	
Proving Ring	703745		6/10/03	
Proving Ring	711700		6/10/03	
U.W. Container	703286		8/26/03	
Troxler Gage	18792		4/16/04	
Troxler Gage	18793		4/16/04	
Troxler Gage	14088		4/17/04	
Troxler Gage	14089		4/17/04	

**INEEL MATERIALS LAB TEST REPORT
ON THE ANALYSIS OF COLLECTED SAMPLES FROM THE
GROUP 1 (TSF-06 AND TSF-26) SOILS**

1. INTRODUCTION

This report defines the tests that were requested and conducted on the Group 1 soil samples delivered to the INEEL Materials Test Lab on May 15th, 2003. This testing was conducted under an ER scope of work (ER-SOW-434).

2. TESTING REQUIREMENTS

The testing requirements for these Group 1 soil samples had been identified in Table 1 of the SOW-434. Fifteen (15) soil samples were delivered by Boe Reynolds on a Chain of Custody (form #435.20). The chain of custody forms indicated the following:

- Sample ID#
- Sample Date
- Sample Location
- Depth of Sample
- Type of Sample
- Analysis Type
- Remarks

All 15 of the soil samples were to be tested for physical properties including:

- Atterberg Limits: ASTM D4318, D423, D424
- Particle Size: ASTM D1140, D1557, D422
- Moisture Content: ASTM D2216

3. TEST REPORT

Samples were tested at the INEEL Materials Lab, located at CFA 602. The soils represent typical TAN area soils. These soils are, for the most part, old lake bed clay soils intermixed with sand and fine gravel layers. The soils at TAN are typically classified as lean clay soils to the Unified Soil Classification System (USCS). The Following tables indicate a summary of the individual test report forms and test results obtained on each sample. The Materials Test Lab made every effort to assure that the samples tested were representative of the samples as delivered. Test results are calculated using GeoSystem software from VES, Inc., Fort Collins, CO. The following tables

are a summary of the various soil results and corresponding test hole locations.

Table 1: Classifications, Liquid Limits, Plastic Limits and Plasticity Index

Sample ID#	Lab Log #	Bore Hole #	Depth	AASHTO Class.	USCS Class.	PL	LL	PI
1RA17601P R	32	#1 South	1.5'- 3.0'	A-6(12)	CL	31.6	16.0	15.6
1RA17602P R	33	#2 South	5.0'- 6.5'	A-6(13)	CL	31.9	16.1	15.8
1RA17603P R	26	#3 South	8.5'- 9.92'	A-6(13)	CL	33.4	17.0	16.4
1RA17604P R	27	#4 South	11.0'- 12.5'	A-6(5)	CL	25.1	14.1	11.0
1RA17605P R	28	#5 South	14.0'- 15.5'	A-4(3)	CL	23.4	14.3	9.1
1RA17606P R	29	#6 South	17.0'- 18.5'	A-4(1)	SC	21.9	13.8	8.1
1RA17607P R	30	#7 South	20.0'- 21.5'	A-6(5)	CL	26.7	14.2	12.5
1RA17608P R	31	#8 South	23.0'- 24.5'	A-6(6)	CL	28.9	15.6	133
1RA17701P R	19	#1 North	5.0'- 6.5'	A-6(11)	CL	30.9	14.6	16.3
1RA17702P R	20	#2 North	8.0'- 9.5'	A-6(10)	CL	30.0	16.3	13.7
1RA17703P R	21	#3 North	11.0'- 12.5'	A-6(11)	CL	31.1	15.6	15.5
1RA17704P R	22	#4 North	14.0'- 15.5'	A-6(14)	CL	35.7	14.8	20.9
1RA17705P R	23	#5 North	17.0'- 18.5'	A-6(9)	CL	32.7	14.7	18.0
1RA17706P R	24	#6 North	20.0'- 21.5'	A-7-6(21)	CL	45.2	17.9	27.3
1RA17707P R	25	#7 North	23.0'- 24.5'	A-6(10)	CL	34.9	14.0	20.9

Notes:

- 1- AASHTO Classification is to AASHTO Standard M-145, Classification of soils and soil-aggregate mixtures.
- 2- PL – Plastic Limit, LL – Liquid Limit, PI – Plasticity Index.
- 3- USCS, Unified Soils Classification System

Table 2: Percent Gravel, Sand, Silt, Clay and Moisture Content

Sample ID#	Lab Log #	Bore Hole #	Depth	% Gravel	% Sand	% Silt	% Clay	% Moist.
1RA17601P R	32	#1 South	1.5'-3.0'	0	13.6	36.3	50.0	10.1
1RA17602P R	33	#2 South	5.0'-6.5'	0	12.0	28.7	59.3	12.9
1RA17603P R	26	#3 South	8.5'-9.92'	0	11.8	35.4	52.8	17.8
1RA17604P R	27	#4 South	11.0'-12.5'	0	32.6	21.4	46.0	14.9
1RA17605P R	28	#5 South	14.0'-15.5'	1.6	32.6	27.6	38.2	16.8
1RA17606P R	29	#6	17.0'-18.5'	1.9	50.4	14.6	33.1	12.3
1RA17607P R	30	South South	20.0'-21.5'	0	40.4	15.1	44.5	18.3
1RA17608P R	31	#8 South	23.0'-24.5'	1.4	33.2	27.8	37.6	20.5
1RA17701P R	19	#1 North	5.0'-6.5'	0	20.7	29.7	49.6	14.9
1RA17702P R	20	#2 North	8.0'-9.5'	0	19.1	25.9	55.0	15.0
1RA17703P R	21	#3 North	11.0'-12.5'	0	16.7	29.5	53.8	14.6
1RA17704P R	22	#4 North	14.0'-15.5'	3.2	22.2	22.1	52.5	19.6
1RA17705P R	23	#5 North	17.0'-18.5'	4.5	29.1	20.4	46.0	16.1
1RA17706P R	24	#6 North	20.0'-21.5'	0	20.9	13.6	65.5	19.8
1RA17707P R	25	#7 North	23.0'-24.5'	4.0	34.9	20.3	40.8	17.3

Notes:

- 1- Gravel defined as particles retained on #4 sieve.
- 2- Sand defined as particles passing #4 sieve and retained on #200 sieve
- 3- Silt defined as particles passing #200 sieve and larger than .005 mm
- 4- Clay defined as particles smaller than .005 mm
- 5- Percent moisture reported is total sample moisture

There were no soil sample anomalies found or observed during the testing of these samples. As indicated on the individual test sheets and summary

tables, there is a fairly wide range of moisture contents and plasticity indices. This wide range of results can be typical of naturally deposited soils by water and/or wind. Some of the samples contained small, fine gravel pieces. One sample out of the fifteen tested classified as "clayey sand", rather than the typical "lean clay" designation of the other fourteen samples.

4. SUMMARY

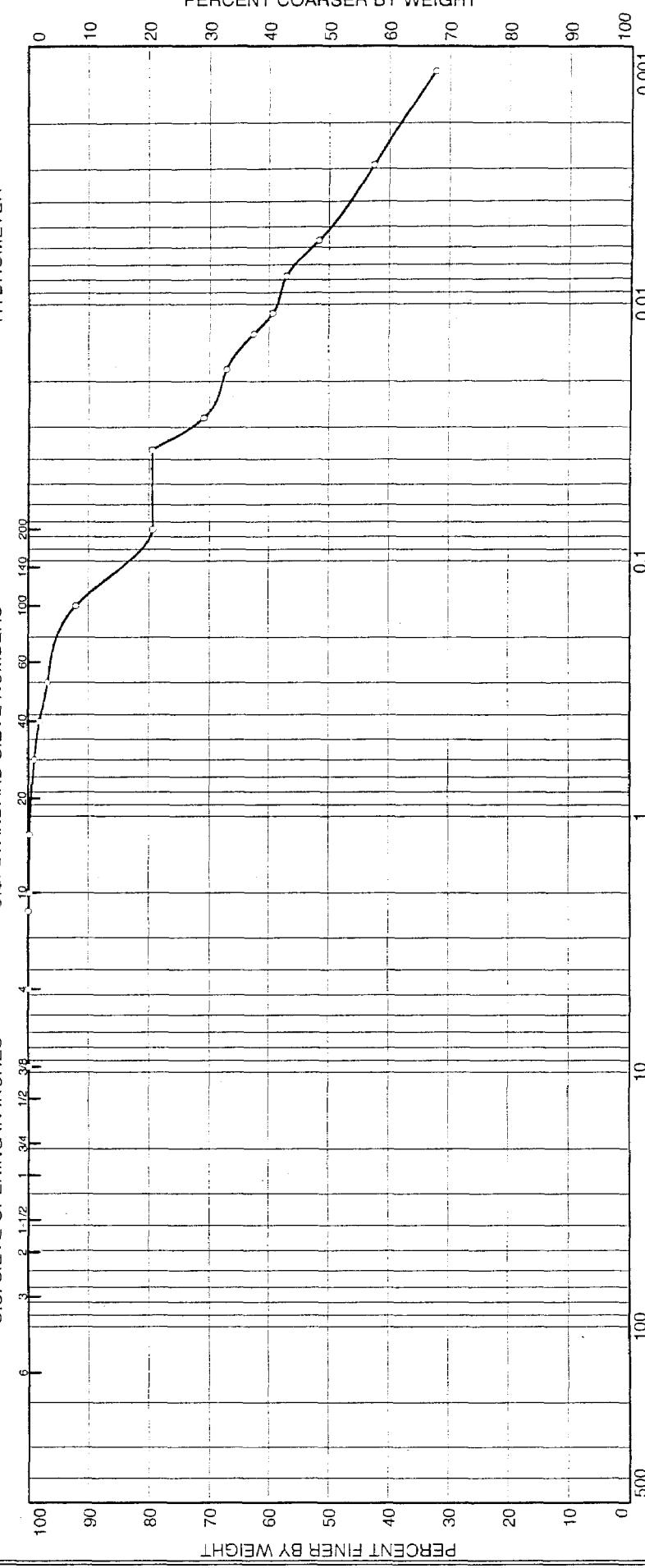
The field data collected during the drilling and sampling of these boreholes is not included in this report, as they were not transmitted with the soil samples. It would be a suggestion of this Lab that the field investigation data be compared and evaluated with these Lab results to further verify any engineering or geo-technical requirements that may be needed. All soil samples tested at the CFA 602 Materials Lab were disposed of in our "cold waste" dumpster at the CFA Landfill. This dumpster at CFA 602 is specifically for the disposal of soils and concrete samples.

Any questions or comments on this test report summary may be directed to Craig Bean, INEEL Materials Lab, CFA 602. Phone number 526-9941.

HC Bean
CFA 602
10 June 2003

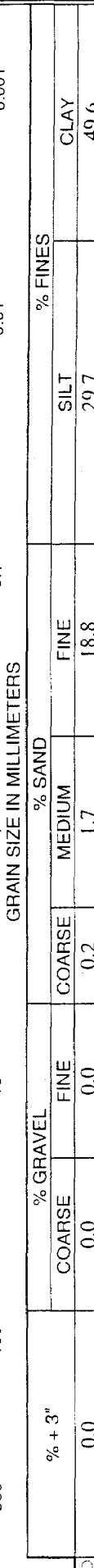
PARTICLE SIZE DISTRIBUTION TEST REPORT

U.S. SIEVE OPENING IN INCHES



HYDROMETER

PERCENT COARSER BY WEIGHT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	MATERIAL DESCRIPTION		
				% GRAVEL	% SAND	% FINES
D&D TSF 06-26 soils		5' - 6.5'	6/9/03	0.0	0.0	100
				0.0	0.2	99.8
					1.7	88.3
					18.8	81.1
					29.7	70.3
					49.6	49.6

Client
Project
Project No. _____ Plate _____

(1) Sample #IRA17701PR sampled May 14th, 2003, Borehole
#1 North.

INEEL MATERIALS LAB

Lab Log #019

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17701PR

Elev. or Depth: 5' - 6.5'

Sample Length (in./cm.): LL #019

Location:

Description: Lean clay with sand

Date: 6/9/03

Natural Moisture: 14.9%

Liquid Limit: 30.9

Plastic Limit: 14.6

USCS Class.: CL

Testing Remarks: Sample #1RA17701PR sampled May14th, 2003. Borehole #1 North.

Lab Log #019

Mechanical Analysis Data

Initial

Dry sample and tare= 402.44

Tare = 105.79

Dry sample weight = 296.65

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
" 4	0.00	0.00	100.0
" 8	0.00	0.00	100.0
# 10	0.47	0.00	99.8
# 16	0.24	0.00	99.8
# 30	2.34	0.00	99.0
# 40	2.66	0.00	98.1
# 50	3.87	0.00	96.8
# 100	14.06	0.00	92.0
# 200	37.81	0.00	79.3

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 99.8

Weight of hydrometer sample: 68.17

Hygroscopic moisture correction:

Moist weight & tare = 405.64

Dry weight & tare = 402.44

Tare = 105.79

Hygroscopic moisture= 1.1 %

Calculated biased weight= 67.58

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	55.0	51.7	0.0138	56.0	7.1	0.0368	79.4
2.00	23.0	49.5	46.2	0.0138	50.5	8.0	0.0276	70.9
5.00	23.0	47.0	43.7	0.0138	48.0	8.4	0.0179	67.1
10.00	23.0	44.0	40.7	0.0138	45.0	8.9	0.0130	62.5
15.00	23.0	42.0	38.7	0.0138	43.0	9.2	0.0108	59.4
30.00	23.0	40.5	37.2	0.0138	41.5	9.5	0.0078	57.1
60.00	23.0	37.0	33.7	0.0138	38.0	10.1	0.0056	51.7
250.00	23.0	31.0	27.7	0.0138	32.0	11.0	0.0029	42.5
1440.00	24.0	24.0	21.0	0.0136	25.0	12.2	0.0013	32.2

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

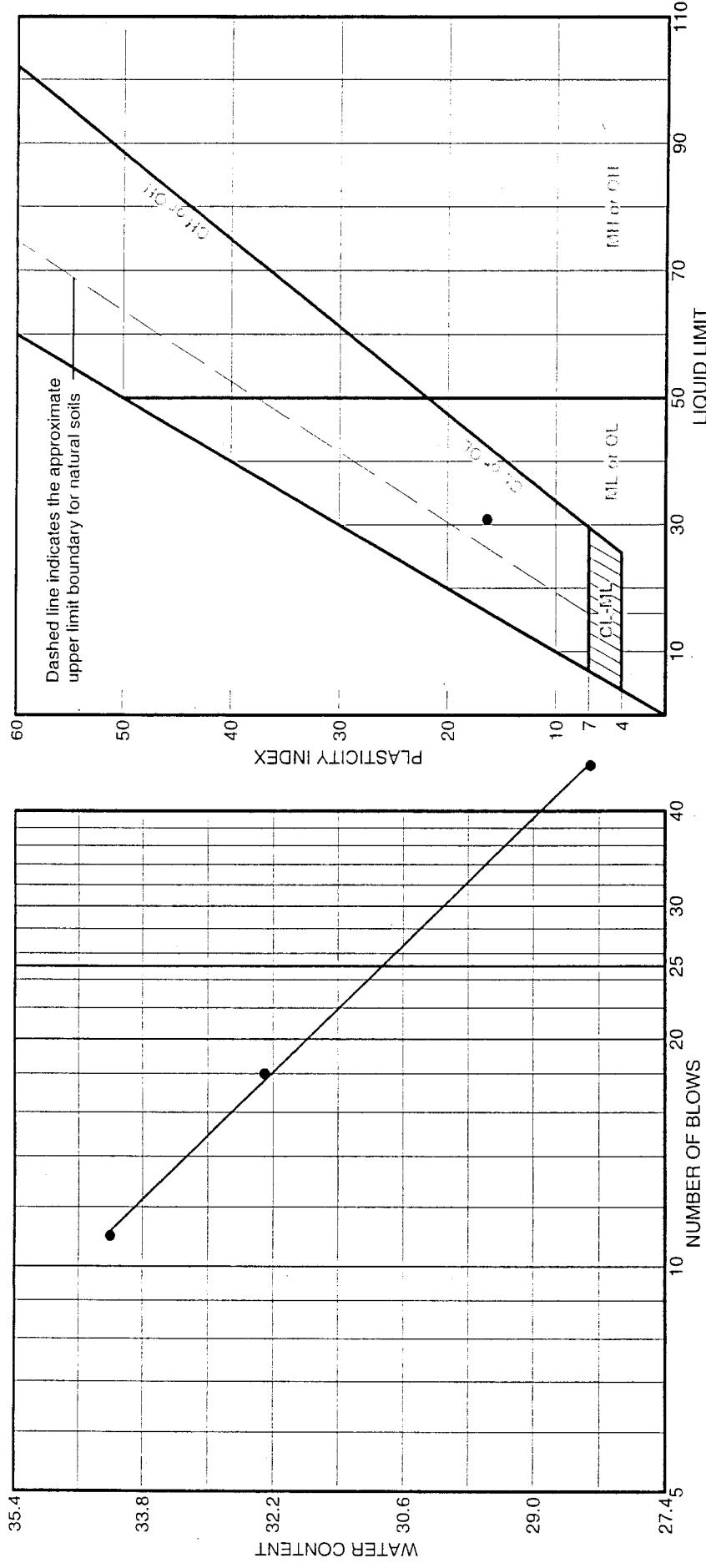
% + 3" = % GRAVEL =

% SAND = 20.7 (% coarse = 0.2 % medium = 1.7 % fine = 18.8)

% SILT = 29.7 % CLAY = 49.6

D₈₅= 0.11 D₆₀= 0.01 D₅₀= 0.01

LIQUID AND PLASTIC LIMITS TEST REPORT



- Sample # IRA17701PR Sampled May 14th, 2003.
Borehole #1 North.

INEEL MATERIALS LAB

Project No. _____ | Plate

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17701PR

Elev. or Depth: 5' - 6.5'

Sample Length (in./cm.): LL #019

Location:

Description: Lean clay with sand

Date: 6/9/03 **Natural Moisture:** 14.9%

USCS Class.: CL

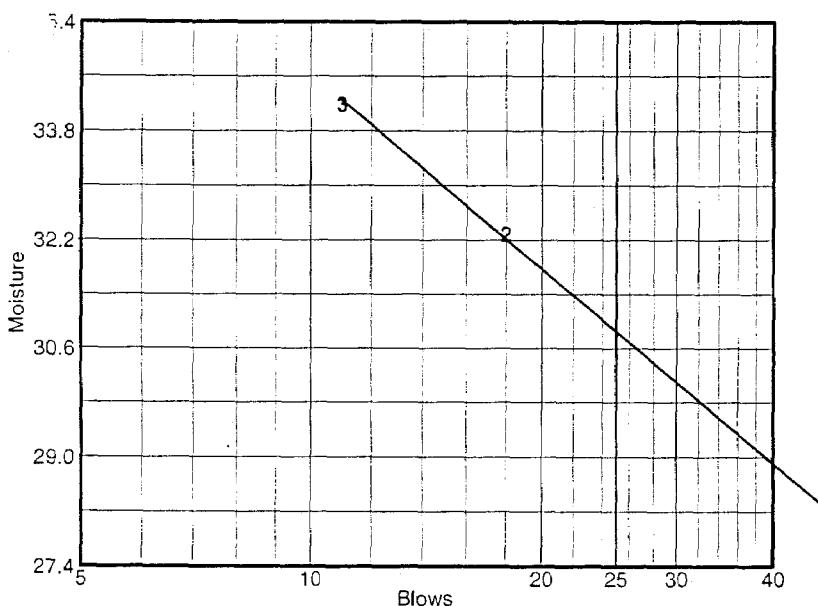
AASHTO Class.: A-6(11)

Testing Remarks: Sample # 1RA17701PR Sampled May 14th, 2003. Borehole #1 North.

Lab Log #019

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.40	22.85	23.06			
Dry+Tare	20.68	19.97	20.02			
Tare	11.07	11.06	11.13			
# Blows	46	18	11			
Moisture	28.3	32.3	34.2			

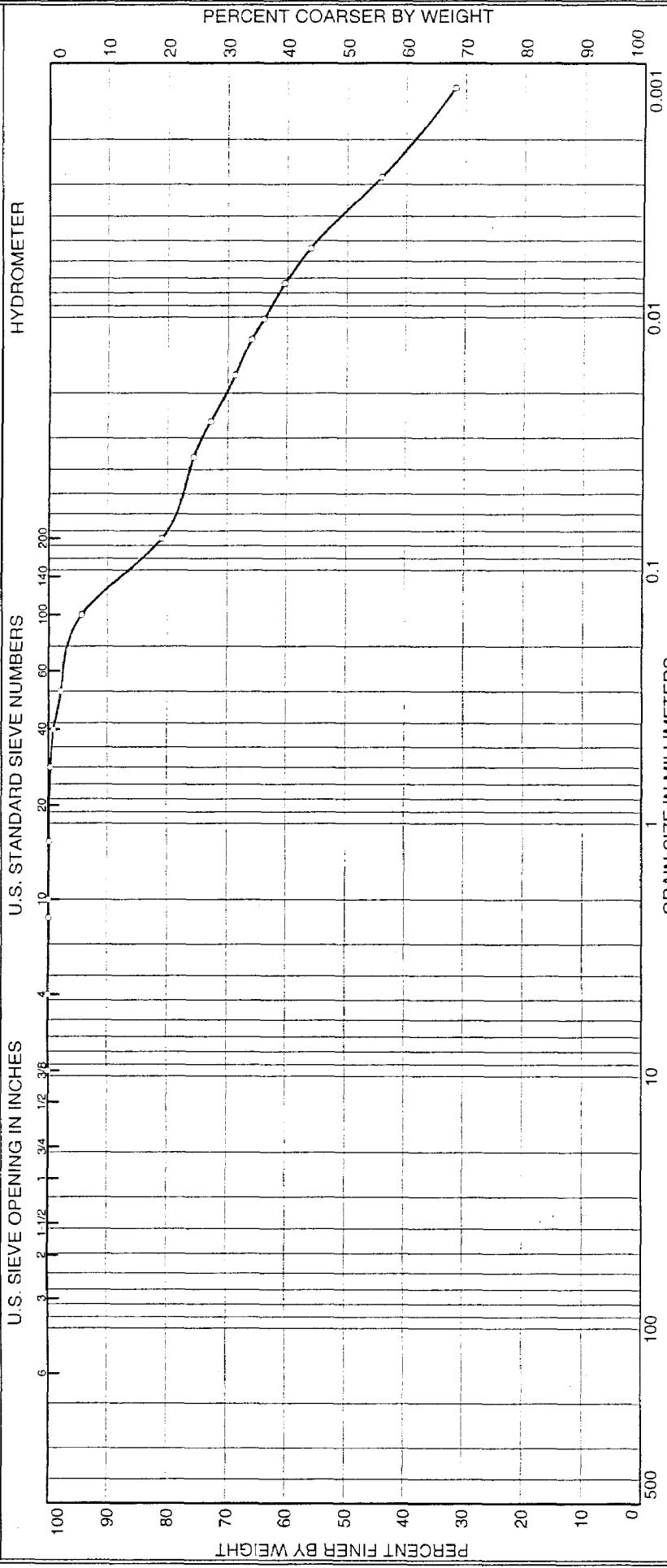


Liquid Limit= 30.9
Plastic Limit= 14.6
Plasticity Index= 16.3

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	9.31	8.67		
Dry+Tare	8.66	8.12		
Tare	4.30	4.31		
Moisture	14.9	14.4		

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% FINES	CLAY
	COARSE	FINE	COARSE	MEDIUM
0.0	0.0	0.0	0.1	0.9
				18.1
				25.9
				55.0

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D&D TSF 06-26 soils		8' - 9.5'	6/9/03	CL	Lean clay with sand	15.0%	30.0	16.3

(1) Sample # IRA17702PR sampled May 14th, 2003. Borehole
#2 North

INEEL MATERIALS LAB

Client	Lab Log #020
Project	
Project No.	Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17702PR

Elev. or Depth: 8' - 9.5'

Sample Length (in./cm.): LL #020

Location:

Description: Lean clay with sand

Date: 6/9/03

Natural Moisture: 15.0%

Liquid Limit: 30.0

Plastic Limit: 16.3

USCS Class.: CL

Testing Remarks: Sample #1RA17702PR sampled May 14th, 2003. Borehole #2 North

Lab Log #020

Mechanical Analysis Data

Initial

Dry sample and tare= 351.81

Tare = 103.84

Dry sample weight = 247.97

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.17	0.00	99.9
# 10	0.08	0.00	99.9
# 16	0.34	0.00	99.8
# 30	0.50	0.00	99.6
# 40	1.48	0.00	99.0
# 50	2.81	0.00	97.8
# 100	8.81	0.00	94.3
# 200	33.06	0.00	80.9

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 99.9

Weight of hydrometer sample: 75.755

Hygroscopic moisture correction:

Moist weight & tare = 356.82

Dry weight & tare = 351.81

Tare = 103.84

Hygroscopic moisture= 2.0 %

Calculated biased weight= 74.33

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	57.5	54.2	0.0138	58.5	6.7	0.0357	75.6
2.00	23.0	55.5	52.2	0.0138	56.5	7.0	0.0259	72.8
5.00	23.0	52.5	49.2	0.0138	53.5	7.5	0.0169	68.7
10.00	23.0	50.5	47.2	0.0138	51.5	7.8	0.0122	65.9
15.00	23.0	49.0	45.7	0.0138	50.0	8.1	0.0101	63.8
30.00	23.0	46.5	43.2	0.0138	47.5	8.5	0.0073	60.3
60.00	23.0	43.5	40.2	0.0138	44.5	9.0	0.0053	56.1
250.00	23.0	35.0	31.7	0.0138	36.0	10.4	0.0028	44.2
1440.00	23.0	26.0	22.7	0.0138	27.0	11.9	0.0013	31.7

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

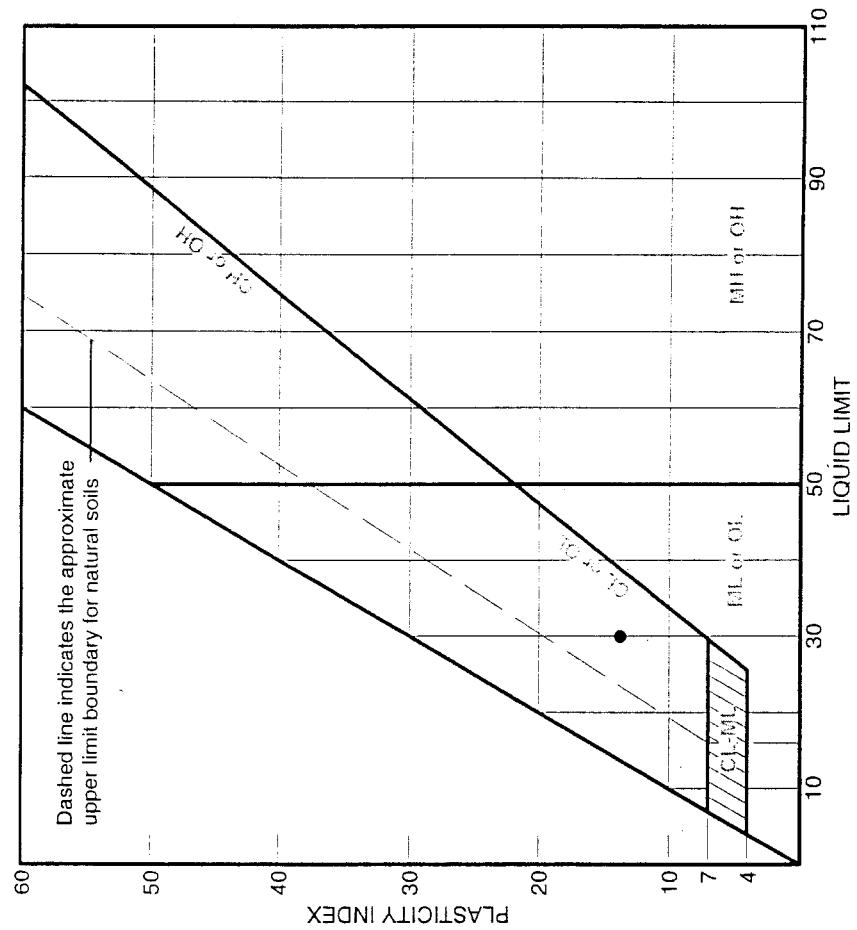
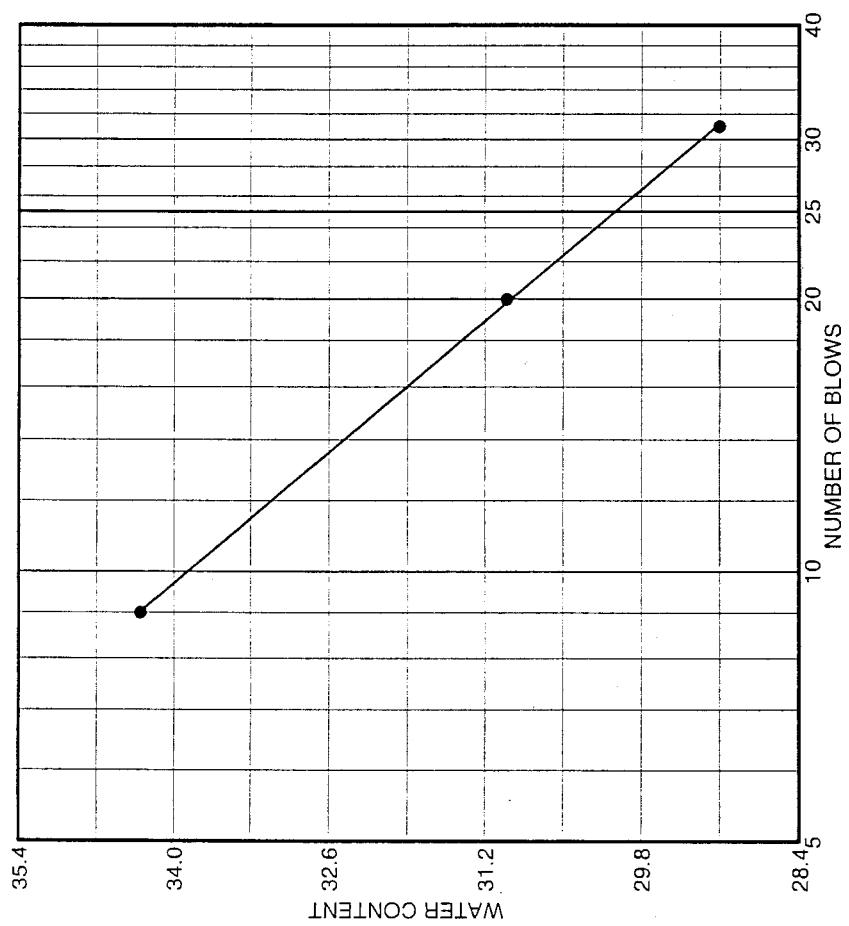
% + 3" = % GRAVEL =

% SAND = 19.1 (% coarse = 0.1 % medium = 0.9 % fine = 18.1)

% SILT = 25.9 % CLAY = 55.0

D₈₅= 0.09 D₆₀= 0.01 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



Sample #1 RA17702PR Sampled May 14th, 2003. Borehole #2 North.

Lab Log #020

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
 Project:
 Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17702PR

Elev. or Depth: 8' - 9.5'

Sample Length (in./cm.): LL #020

Location:

Description: Lean clay with sand

Date: 6/9/03 Natural Moisture: 15.0%

USCS Class.: CL

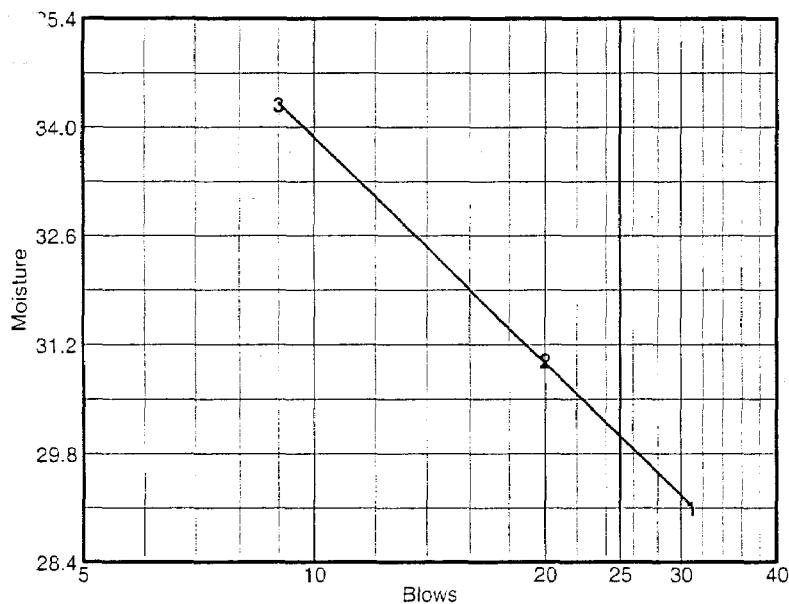
AASHTO Class.: A-6(10)

Testing Remarks: Sample #1RA17702PR Sampled May 14th, 2003. Borehole #2 North.

Lab Log #020

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.83	25.12	23.92			
Dry+Tare	22.50	21.79	20.65			
Tare	11.07	11.06	11.13			
# Blows	31	20	9			
Moisture	29.1	31.0	34.3			

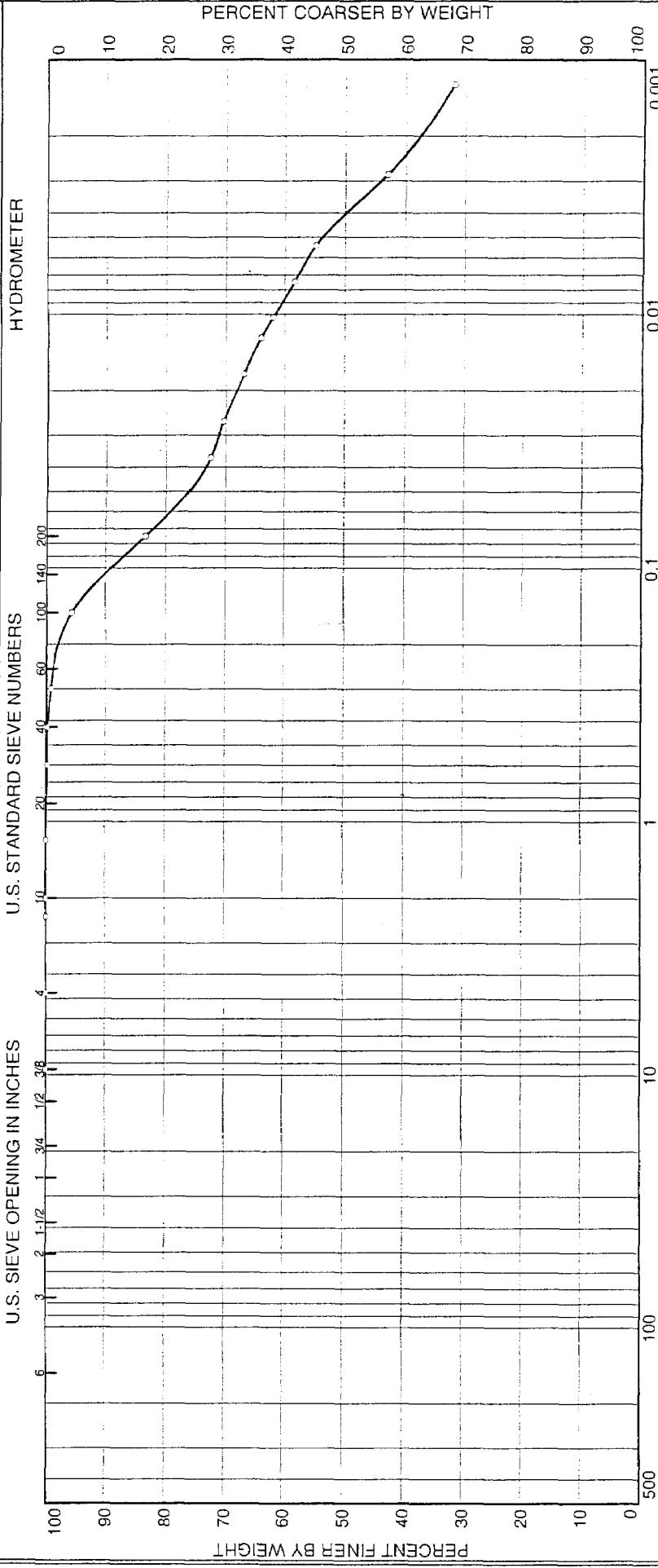


Liquid Limit= 30.0
 Plastic Limit= 16.3
 Plasticity Index= 13.7

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	8.21	8.73		
Dry+Tare	7.63	8.15		
Tare	4.30	4.31		
Moisture	17.4	15.1		

PARTICLE SIZE DISTRIBUTION TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION
D&D TSF 06-26 soils		11.0' - 12.5'	6/9/03	CL	Lean clay with sand

○ Sample #1RA1703PR sampled May 14th, 2003. Borehole #3 North

Lab Log #021.

INEEL MATERIALS LAB

Client	
Project	
Project No.	Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17703PR

Elev. or Depth: 11.0' - 12.5'

Sample Length (in./cm.): LL #021

Location:

Description: Lean clay with sand

Date: 6/9/03

Natural Moisture: 14.6%

Liquid Limit: 31.1

Plastic Limit: 15.6

USCS Class.: CL

Testing Remarks: Sample #1RA17703PR sampled May 14th, 2003. BoreHole #3 North

Lab Log #021.

Mechanical Analysis Data

Initial

Dry sample and tare= 404.82

Tare = 106.62

Dry sample weight = 298.20

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.00	0.00	100.0
# 16	0.05	0.00	100.0
# 30	0.41	0.00	99.8
# 40	0.54	0.00	99.7
# 50	1.55	0.00	99.1
# 100	10.46	0.00	95.6
# 200	36.81	0.00	83.3

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 100.0

Weight of hydrometer sample: 75.58

Hygroscopic moisture correction:

Moist weight & tare = 410.92

Dry weight & tare = 404.82

Tare = 106.62

Hygroscopic moisture= 2.0 %

Calculated biased weight= 74.06

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.2

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	55.0	51.7	0.0138	56.2	7.1	0.0367	72.4
2.00	23.0	53.5	50.2	0.0138	54.7	7.3	0.0264	70.3
5.00	23.0	51.0	47.7	0.0138	52.2	7.7	0.0172	66.8
10.00	23.0	49.0	45.7	0.0138	50.2	8.1	0.0124	64.0
15.00	23.0	47.5	44.2	0.0138	48.7	8.3	0.0103	61.9
30.00	23.0	45.0	41.7	0.0138	46.2	8.7	0.0074	58.4
60.00	23.0	42.5	39.2	0.0138	43.7	9.1	0.0054	54.9
250.00	23.0	34.0	30.7	0.0138	35.2	10.5	0.0028	43.0
1440.00	23.0	26.0	22.7	0.0138	27.2	11.8	0.0013	31.8

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL =

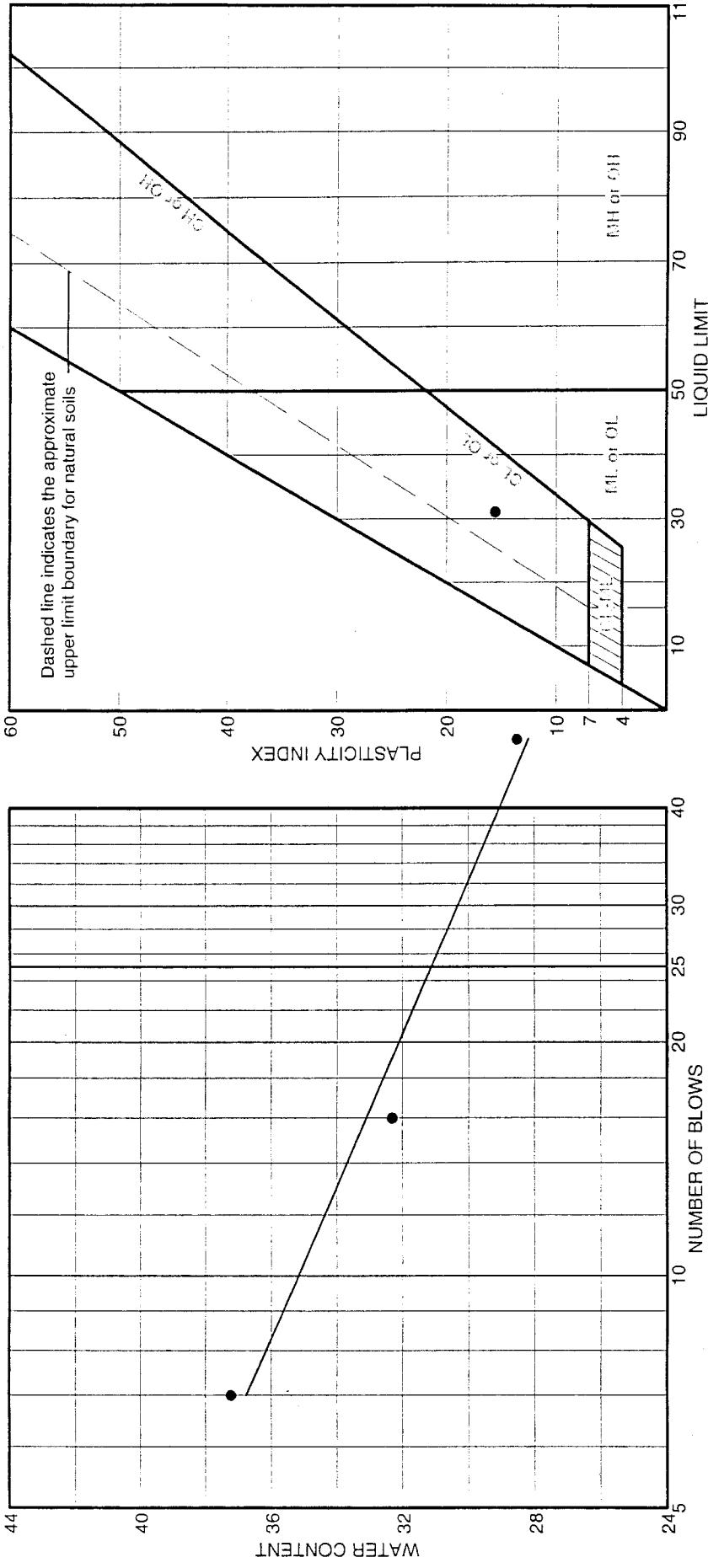
% SAND = 16.7 (% coarse = 0.0 % medium = 0.3 % fine = 16.4)

% SILT = 29.5 % CLAY = 53.8

D₈₅= 0.08 D₆₀= 0.01 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT

44



Sample #1RA17703PR sampled May 14th, 2003. Bore Hole
#3 North

Lab Log #021

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17703PR

Elev. or Depth: 11.0' - 12.5'

Sample Length (in./cm.): LL #021

Location:

Description: Lean clay with sand

Date: 6/9/03 Natural Moisture: 14.6%

USCS Class.: CL

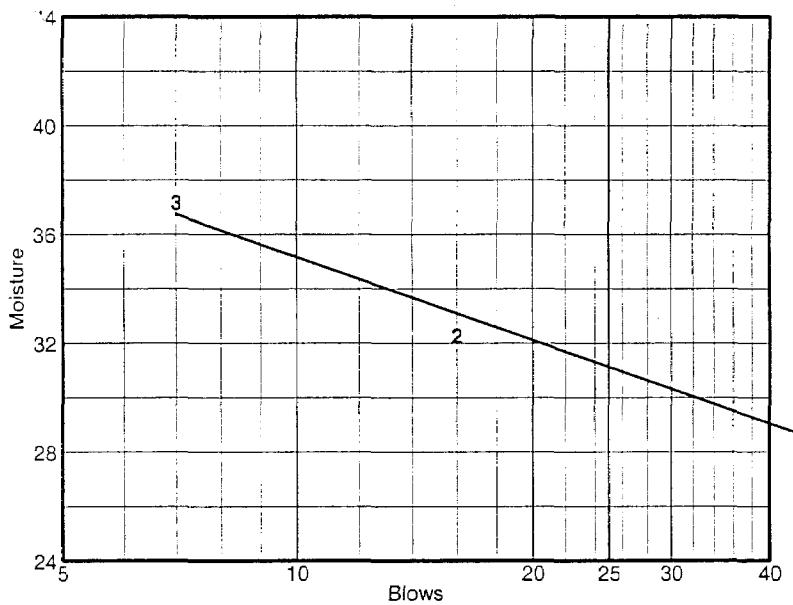
AASHTO Class.: A-6(11)

Testing Remarks: Sample #1RA17703PR sampled May 14th, 2003. Bore Hole #3 North

Lab Log #021

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.72	26.94	24.71			
Dry+Tare	20.89	23.07	21.00			
Tare	10.96	11.09	11.04			
# Blows	49	16	7			
Moisture	28.5	32.3	37.2			

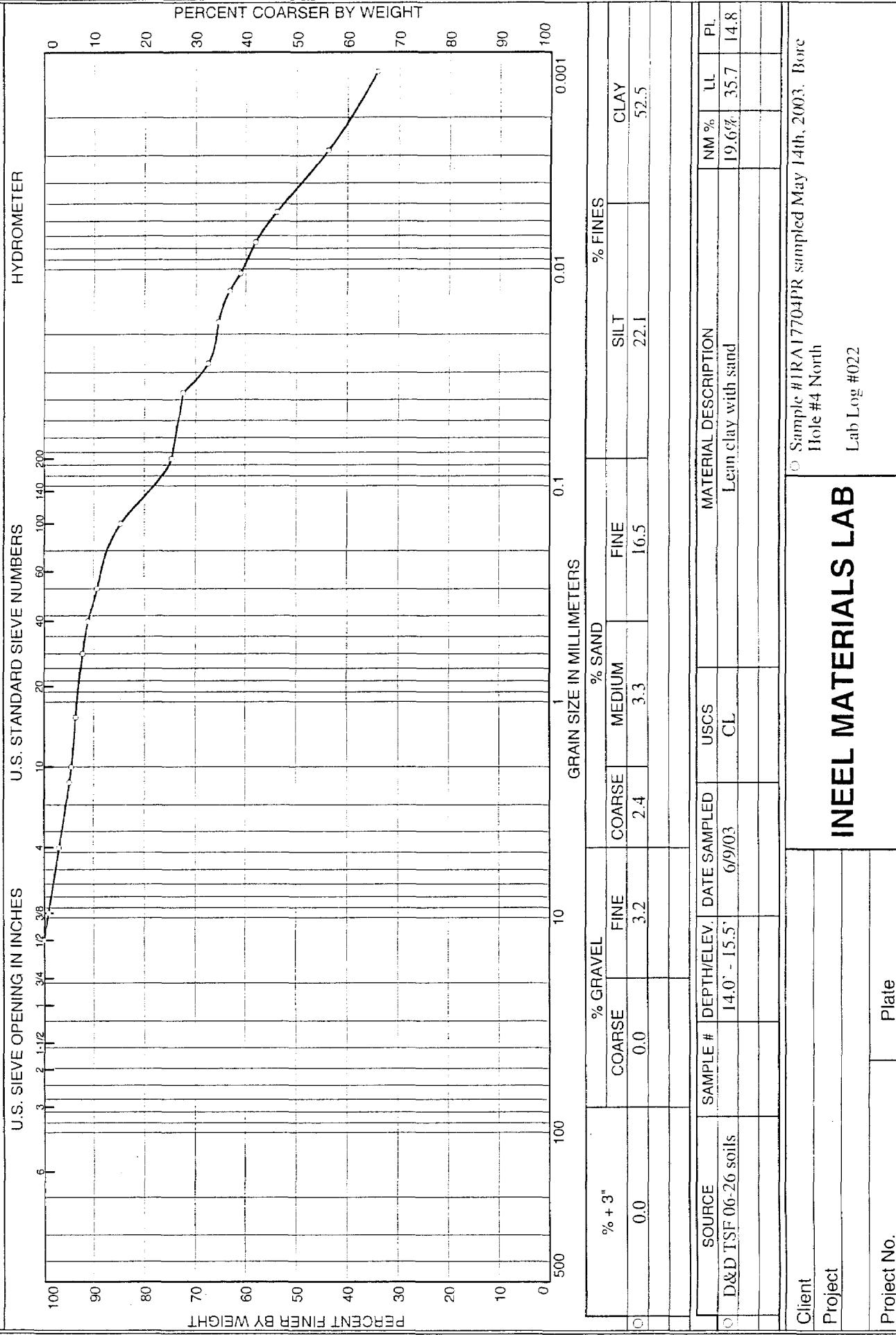


Liquid Limit= 31.1
 Plastic Limit= 15.6
 Plasticity Index= 15.5

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	10.10	9.23		
Dry+Tare	9.32	8.57		
Tare	4.29	4.33		
Moisture	15.5	15.6		

PARTICLE SIZE DISTRIBUTION TEST REPORT



INEEL MATERIALS LAB

Client	
Project	
Project No.	Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17704PR

Elev. or Depth: 14.0' - 15.5'

Sample Length (in./cm.): LL #022

Location:

Description: Lean clay with sand

Date: 6/9/03

Natural Moisture: 19.6%

Liquid Limit: 35.7 Plastic Limit: 14.8 USCS Class.: CL

Testing Remarks: Sample #1RA17704PR sampled May 14th, 2003. Bore Hole #4
Lab Log #022

Mechanical Analysis Data

Initial

Dry sample and tare= 401.67

Tare = 105.11

Dry sample weight = 296.56

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
1/2 inch	0.00	0.00	100.0
3/8 inch	2.93	0.00	99.0
4	6.62	0.00	96.8
8	5.80	0.00	94.8
# 10	1.11	0.00	94.4
# 16	2.68	0.00	93.5
# 30	3.86	0.00	92.2
# 40	3.33	0.00	91.1
# 50	5.41	0.00	89.3
# 100	13.71	0.00	84.7
# 200	29.79	0.00	74.6

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 94.4

Weight of hydrometer sample: 69.21

Hygroscopic moisture correction:

Moist weight & tare = 404.61

Dry weight & tare = 401.67

Tare = 105.11

Hygroscopic moisture= 1.0 %

Calculated biased weight= 72.60

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	54.0	50.7	0.0138	55.0	7.3	0.0372	72.4
2.00	23.0	50.5	47.2	0.0138	51.5	7.8	0.0273	67.4
5.00	23.0	49.0	45.7	0.0138	50.0	8.1	0.0176	65.3
10.00	23.0	47.5	44.2	0.0138	48.5	8.3	0.0126	63.1
15.00	23.0	46.0	42.7	0.0138	47.0	8.6	0.0104	61.0
30.00	23.0	44.0	40.7	0.0138	45.0	8.9	0.0075	58.1
60.00	23.0	41.0	37.7	0.0138	42.0	9.4	0.0055	53.9
250.00	23.0	34.0	30.7	0.0138	35.0	10.6	0.0028	43.8
1440.00	24.0	27.0	24.0	0.0136	28.0	11.7	0.0012	34.2

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

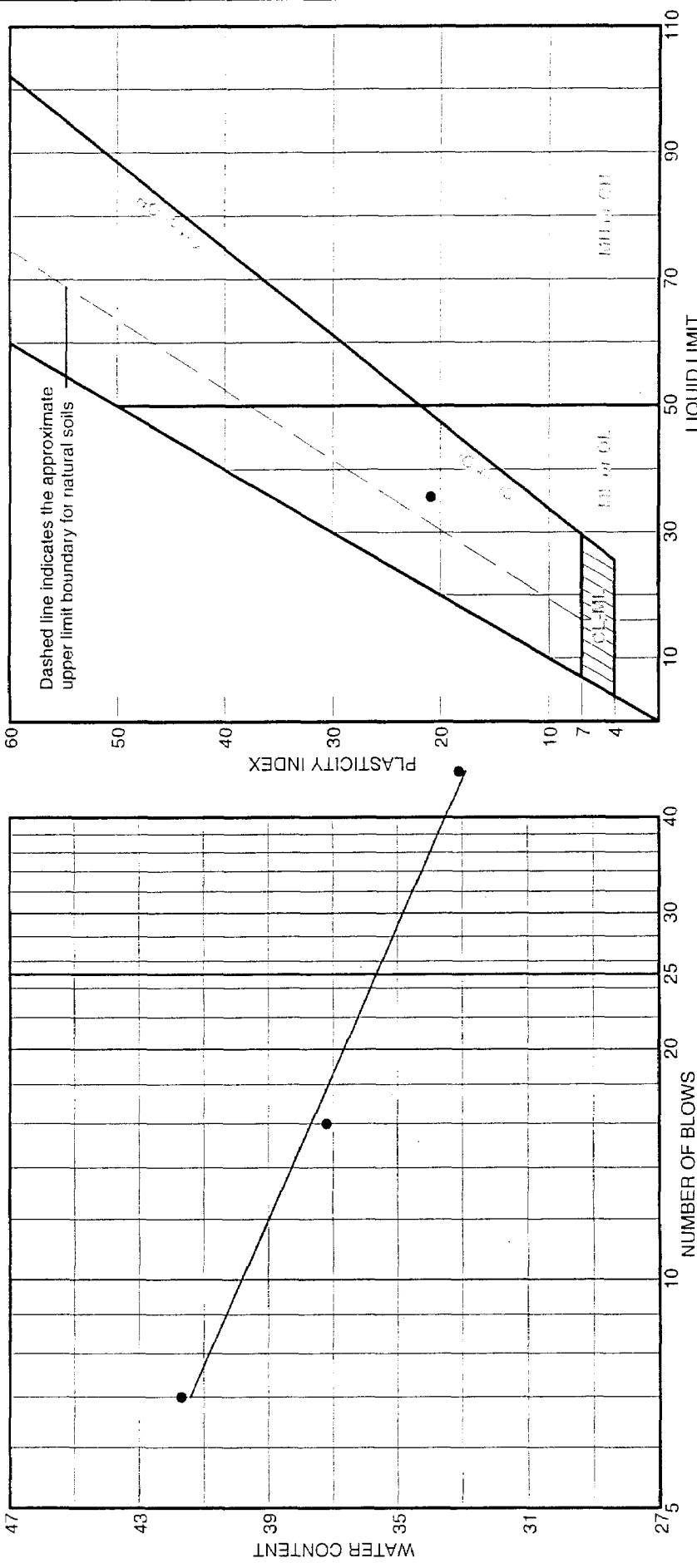
% + 3" = % GRAVEL = 3.2 (% coarse = % fine = 3.2)

% SAND = 22.2 (% coarse = 2.4 % medium = 3.3 % fine = 16.5)

% SILT = 22.1 % CLAY = 52.5

D₈₅= 0.15 D₆₀= 0.01 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



Sample IKA 11/04 R sampled May 14th, 2003. Bore Hole #4 North

Lab Log #022

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17704PR

Elev. or Depth: 14.0' - 15.5'

Sample Length (in./cm.): LL #022

Location:

Description: Lean clay with sand

Date: 6/9/03 Natural Moisture: 19.6%

USCS Class.: CL

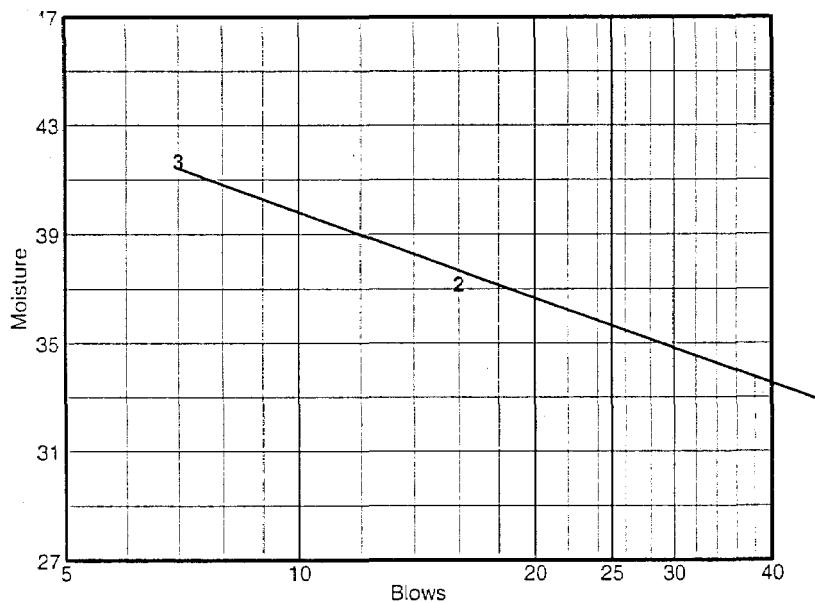
AASHTO Class.: A-6(14)

Testing Remarks: Sample 1RA17704PR sampled May 14th, 2003. Bore Hole #4 North

Lab Log #022

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.35	20.93	25.38			
Dry+Tare	20.27	18.26	21.16			
Tare	10.96	11.09	11.04			
# Blows	46	16	7			
Moisture	33.1	37.2	41.7			

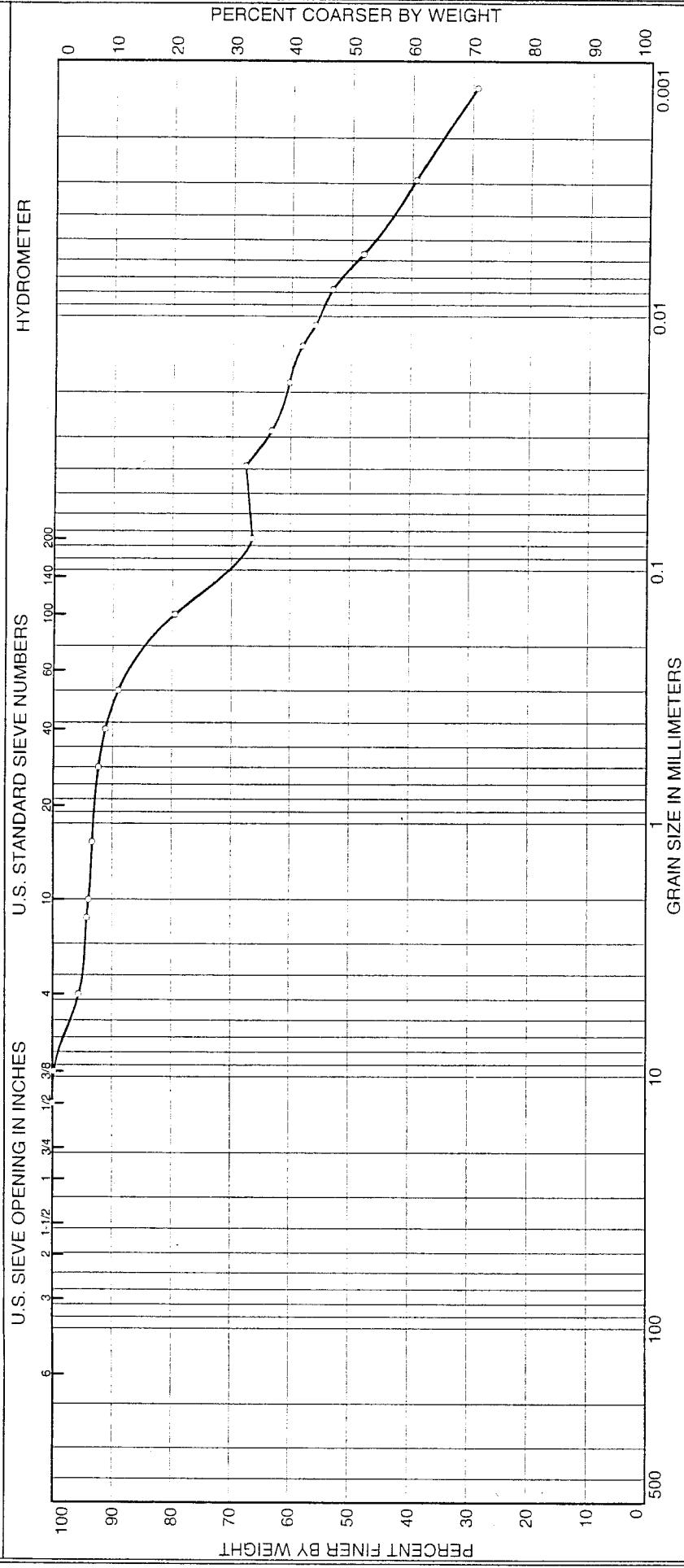


Liquid Limit = 35.7
 Plastic Limit = 14.8
 Plasticity Index = 20.9

Plastic Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	8.54	8.38				
Dry+Tare	7.99	7.86				
Tare	4.29	4.33				
Moisture	14.9	14.7				

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"		% GRAVEL			% SAND		% SILT		% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE		SILT		CLAY
0.0	0.0	0.0	4.5	1.6	2.7	24.8		20.4		46.0

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION
TSF 06-26 soils		17.0' - 18.5'	6/9/03	CL	Sandy loam clay

Sample #IRAI 7705PR sampled May 14th, 2003. Bore Hole #5 North

INEEL MATERIALS LAB

Project No. _____ Plate _____

GRAIN SIZE DISTRIBUTION TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17705PR

Elev. or Depth: 17.0' - 18.5'

Sample Length (in./cm.): LL #023

Location:

Description: Sandy lean clay

Date: 6/9/03

Natural Moisture: 16.1%

Liquid Limit: 32.7 Plastic Limit: 14.7 USCS Class.: CL

Testing Remarks: Sample #1RA17705PR sampled May 14th, 2003. Bore Hole #5 North

Lab Log #23

Mechanical Analysis Data

Initial

Dry sample and tare= 345.32

Tare = 103.67

Dry sample weight = 241.65

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
1/2 inch	0.00	0.00	100.0
3/8 inch	0.72	0.00	99.7
# 4	10.23	0.00	95.5
# 8	3.11	0.00	94.2
# 10	0.59	0.00	93.9
# 16	1.57	0.00	93.3
# 30	2.45	0.00	92.3
# 40	2.52	0.00	91.2
# 50	5.43	0.00	89.0
# 100	22.98	0.00	79.5
# 200	31.68	0.00	66.4

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 93.9

Weight of hydrometer sample: 68.82

Hygroscopic moisture correction:

Moist weight & tare = 350.72

Dry weight & tare = 345.32

Tare = 103.67

Hygroscopic moisture= 2.2 %

Calculated biased weight= 71.69

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	50.0	46.7	0.0138	51.0	7.9	0.0388	67.6
2.00	23.0	47.0	43.7	0.0138	48.0	8.4	0.0283	63.2
5.00	23.0	45.0	41.7	0.0138	46.0	8.8	0.0182	60.3
10.00	23.0	43.5	40.2	0.0138	44.5	9.0	0.0131	58.2
15.00	23.0	42.0	38.7	0.0138	43.0	9.2	0.0108	56.0
30.00	23.0	40.0	36.7	0.0138	41.0	9.6	0.0078	53.1
60.00	23.0	36.5	33.2	0.0138	37.5	10.1	0.0057	48.0
250.00	23.0	30.5	27.2	0.0138	31.5	11.1	0.0029	39.3
1440.00	23.0	23.5	20.2	0.0138	24.5	12.3	0.0013	29.2

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

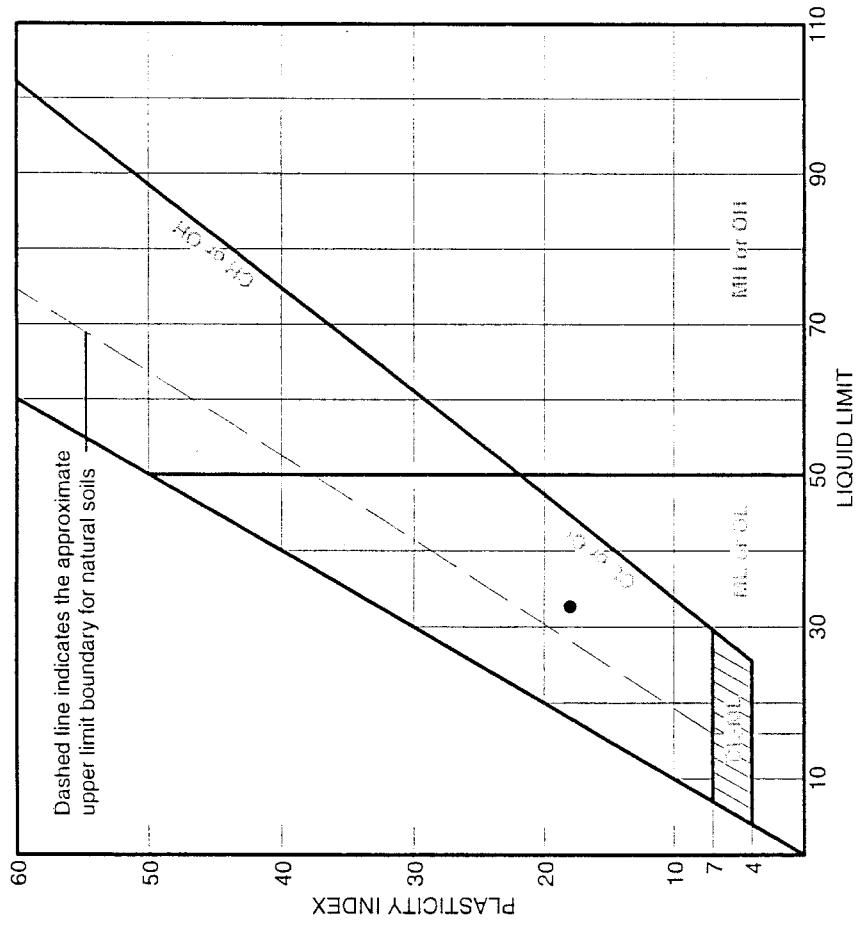
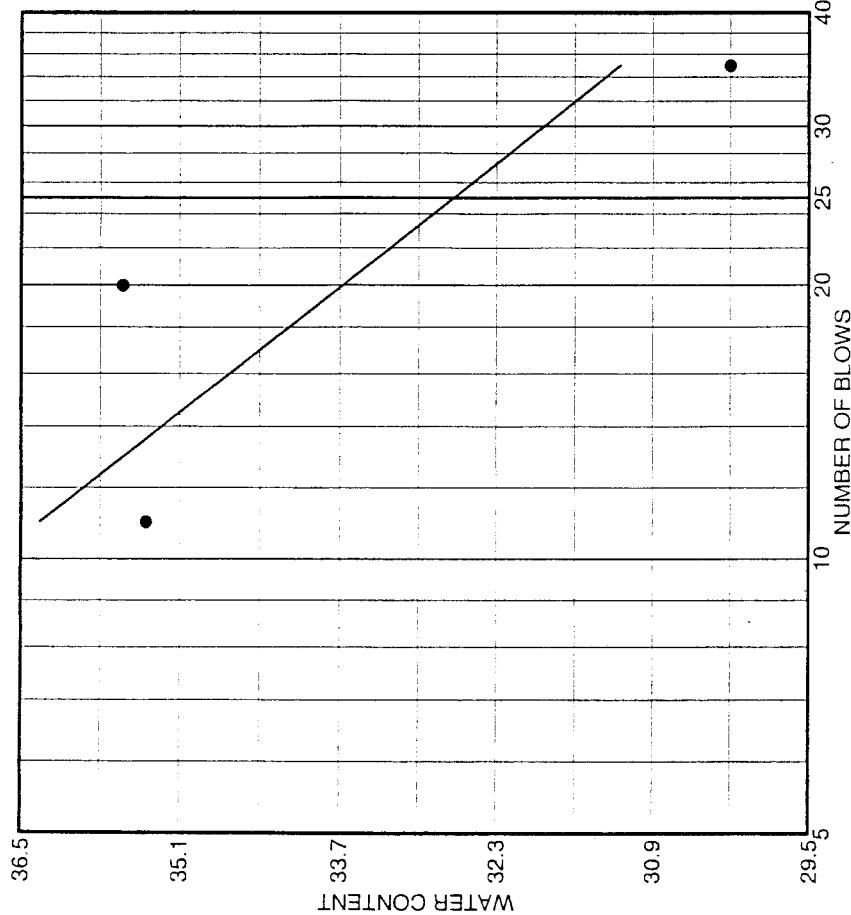
% + 3" = % GRAVEL = 4.5 (% coarse = % fine = 4.5)

% SAND = 29.1 (% coarse = 1.6 % medium = 2.7 % fine = 24.8)

% SILT = 20.4 % CLAY = 46.0

D₈₅= 0.21 D₆₀= 0.02 D₅₀= 0.01
D₃₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
● D&DTSF 06-26 soils		17.0' - 18.5'	6/9/03	CL	Sandy lean clay	16.1%	32.7	18.0

● Sample IPR17705PR Sampled May 14th, 2003. Bore Hole #5 North

Lab Log #023

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17705PR

Elev. or Depth: 17.0' - 18.5'

Sample Length (in./cm.): LL #023

Location:

Description: Sandy lean clay

Date: 6/9/03 Natural Moisture: 16.1%

USCS Class.: CL

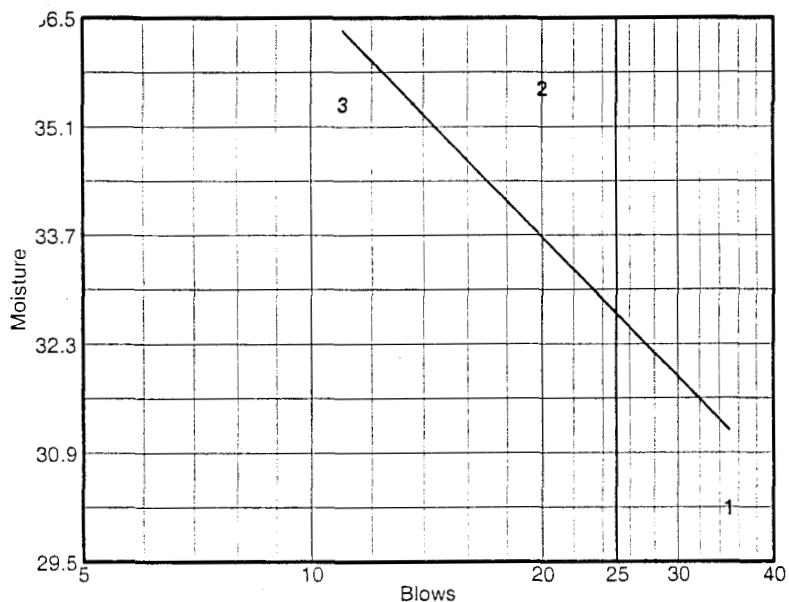
AASHTO Class.: A-6(9)

Testing Remarks: Sample 1PR17705PR Sampled May 14th, 2003. Bore Hole #5 North

Lab Log #023

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.81	24.80	25.48			
Dry+Tare	22.40	21.20	21.72			
Tare	11.12	11.10	11.09			
# Blows	35	20	11			
Moisture	30.2	35.6	35.4			



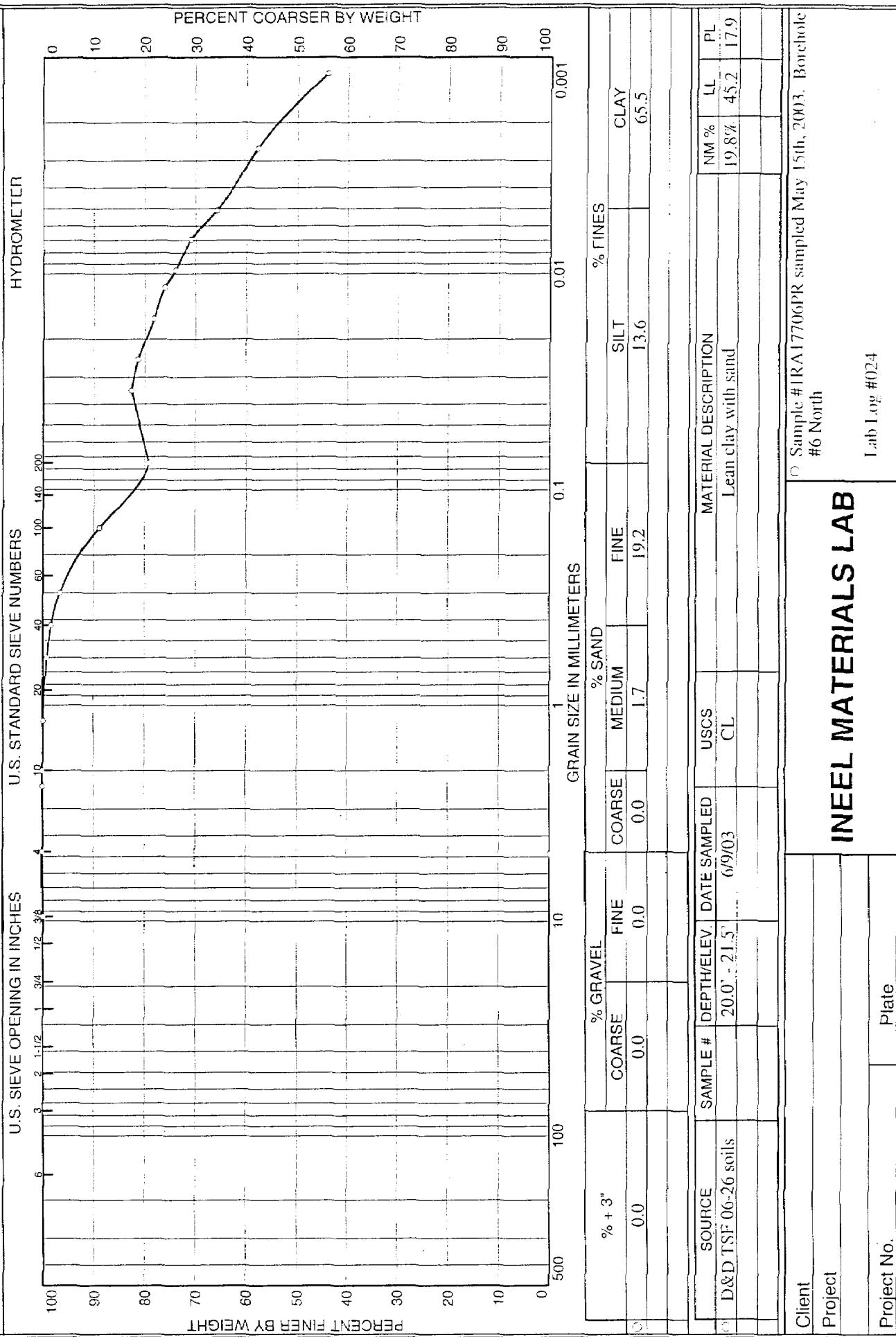
Liquid Limit= 32.7
Plastic Limit= 14.7
Plasticity Index= 18.0

LIQUID AND PLASTIC LIMIT TEST DATA

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	9.06	9.38		
Dry+Tare	8.46	8.73		
Tare	4.33	4.36		
Moisture	14.5	14.9		

PARTICLE SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17706PR

Elev. or Depth: 20.0' - 21.5'

Sample Length (in./cm.): LL #024

Location:

Description: Lean clay with sand

Date: 6/9/03

Natural Moisture: 19.8%

Liquid Limit: 45.2

Plastic Limit: 17.9

USCS Class.: CL

Testing Remarks: Sample #1RA17706PR sampled May 15th, 2003. Borehole #6 North

Lab Log #024

Mechanical Analysis Data

Initial

Dry sample and tare= 362.81

Tare = 105.66

Dry sample weight = 257.15

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
# 1/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.00	0.00	100.0
# 16	0.23	0.00	99.9
# 30	1.91	0.00	99.2
# 40	2.20	0.00	98.3
# 50	4.52	0.00	96.6
# 100	20.04	0.00	88.8
# 200	24.91	0.00	79.1

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 100.0

Weight of hydrometer sample: 74.12

Hygroscopic moisture correction:

Moist weight & tare = 373.34

Dry weight & tare = 362.81

Tare = 105.66

Hygroscopic moisture= 4.1 %

Calculated biased weight= 71.20

Automatic temperature correction

Composite correction at 20 deg C = -4.0

I iscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	60.0	56.7	0.0138	61.0	6.3	0.0346	82.6
2.00	23.0	59.0	55.7	0.0138	60.0	6.5	0.0248	81.2
5.00	23.0	57.0	53.7	0.0138	58.0	6.8	0.0161	78.2
10.00	23.0	55.5	52.2	0.0138	56.5	7.0	0.0116	76.0
15.00	23.0	54.0	50.7	0.0138	55.0	7.3	0.0096	73.9
30.00	23.0	52.0	48.7	0.0138	53.0	7.6	0.0069	70.9
60.00	23.0	48.5	45.2	0.0138	49.5	8.2	0.0051	65.8
250.00	23.0	43.0	39.7	0.0138	44.0	9.1	0.0026	57.8
1440.00	23.0	33.5	30.2	0.0138	34.5	10.6	0.0012	44.0

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

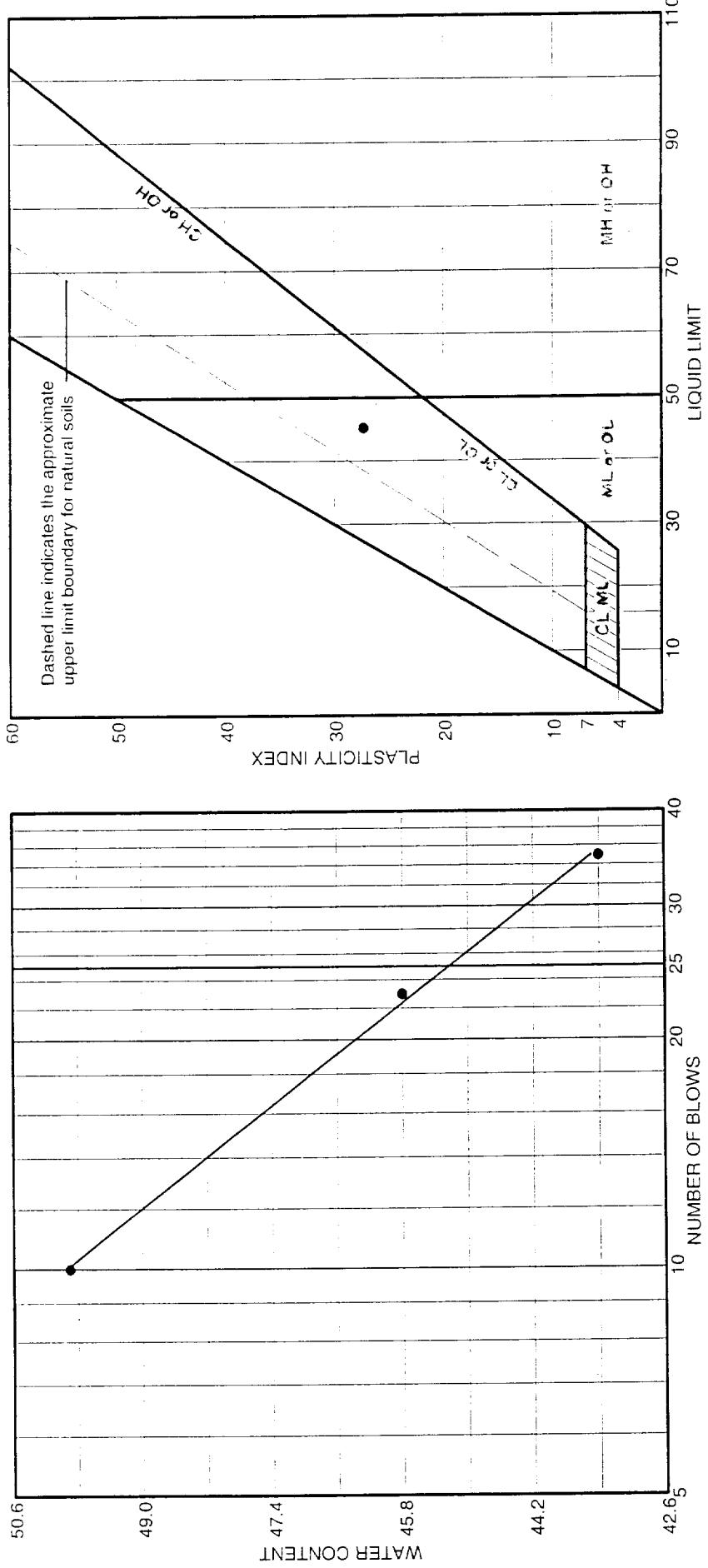
% + 3" = % GRAVEL =

% SAND = 20.9 (% coarse = 0.0 % medium = 1.7 % fine = 19.2)

% SILT = 13.6 % CLAY = 65.5

D₈₅= 0.12 D₆₀= 0.00 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



● Sample #IR17706FR sampled May 5th, 2003. Borehole #6 North

Lab Log #124

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17706PR

Elev. or Depth: 20.0' - 21.5'

Sample Length (in./cm.): LL #024

Location:

Description: Lean clay with sand

Date: 6/9/03 **Natural Moisture:** 19.8%

USCS Class.: CL

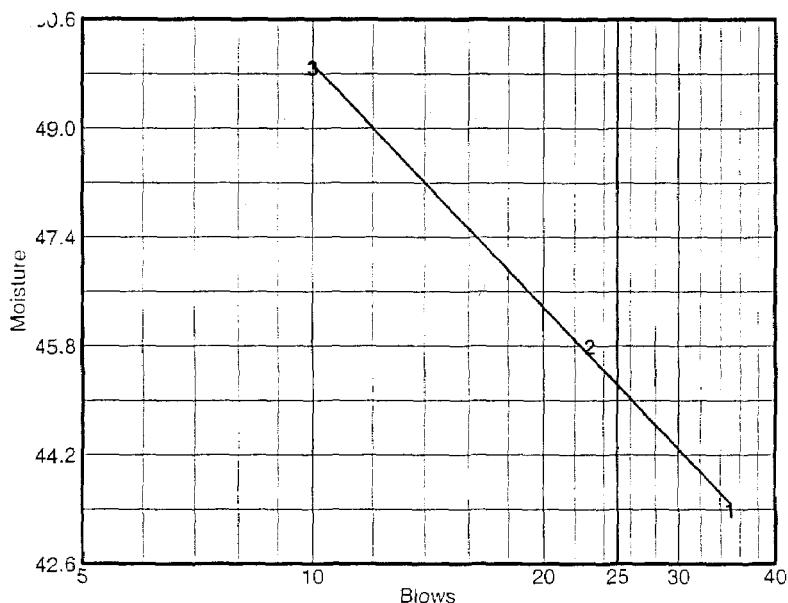
AASHTO Class.: A-7-6(21)

Testing Remarks: Sample #1RA17706PR sampled May 15th, 2003. Borehole #6 North

Lab Log #024

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.14	25.10	23.61			
Dry+Tare	20.90	20.71	19.46			
Tare	11.13	11.13	11.14			
# Blows	35	23	10			
Moisture	43.4	45.8	49.9			



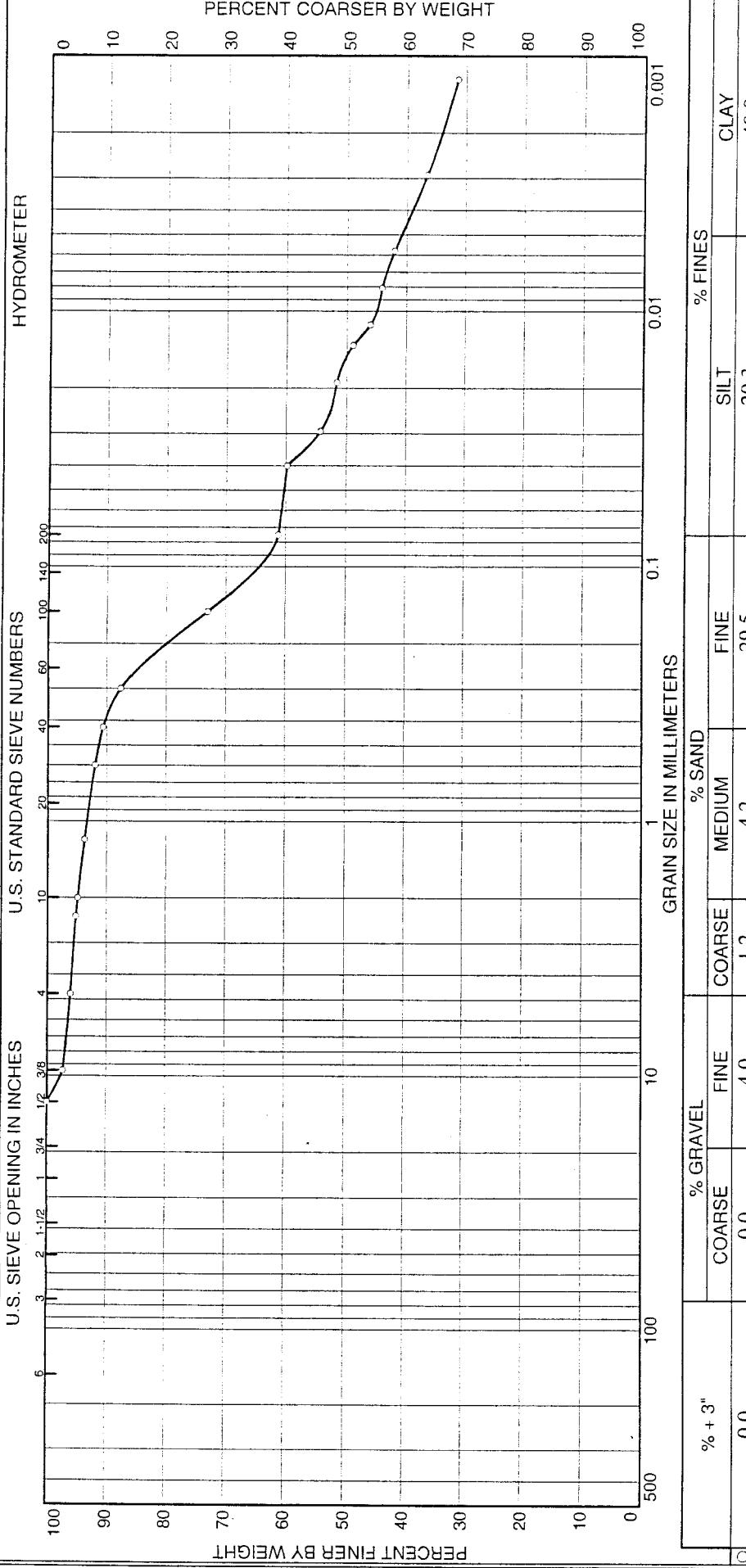
Liquid Limit= 45.2
Plastic Limit= 17.9
Plasticity Index= 27.3

LIQUID AND PLASTIC LIMIT TEST DATA

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	8.09	8.14		
Dry+Tare	7.54	7.54		
Tare	4.34	4.32		
Moisture	17.2	18.6		

PARTICLE SIZE DISTRIBUTION TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D&D TSF 06-26 soils		23.0' - 24.5'	6/9/03	CL	Sandy lean clay	17.3%	34.9	14.0

Sample # IRA17707PR sampled May 15th, 2003. Borehole
#7 North

Lab Log #025

INEEL MATERIALS LAB

Project No. _____ | Plate _____

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17707PR

Elev. or Depth: 23.0' - 24.5'

Sample Length (in./cm.): LL #025

Location:

Description: Sandy lean clay

Date: 6/9/03

Natural Moisture: 17.3%

Liquid Limit: 34.9

Plastic Limit: 14.0

USCS Class.: CL

Testing Remarks: Sample #1RA17707PR sampled May 15th, 2003. Borehole #7

Lab Log #025

Mechanical Analysis Data

Initial

Dry sample and tare= 381.93

Tare = 103.57

Dry sample weight = 278.36

Sieve tare method

Sieve-	Weight retained	Sieve tare	Percent finer
1/2 inch	0.00	0.00	100.0
5/8 inch	7.93	0.00	97.2
# 4	3.30	0.00	96.0
# 8	2.53	0.00	95.1
# 10	0.64	0.00	94.8
# 16	3.18	0.00	93.7
# 30	5.08	0.00	91.9
# 40	3.49	0.00	90.6
# 50	8.45	0.00	87.6
# 100	40.58	0.00	73.0
# 200	33.01	0.00	61.1

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 94.8

Weight of hydrometer sample: 73.06

Hygroscopic moisture correction:

Moist weight & tare = 386.71

Dry weight & tare = 381.93

Tare = 103.57

Hygroscopic moisture= 1.7 %

Calculated biased weight= 75.77

Automatic temperature correction

Composite correction at 20 deg C = -4.0

I scus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	47.0	43.7	0.0138	48.0	8.4	0.0400	59.8
2.00	23.0	43.0	39.7	0.0138	44.0	9.1	0.0294	54.3
5.00	23.0	41.0	37.7	0.0138	42.0	9.4	0.0189	51.6
10.00	23.0	39.0	35.7	0.0138	40.0	9.7	0.0136	48.9
15.00	23.0	37.0	33.7	0.0138	38.0	10.1	0.0113	46.1
30.00	23.0	35.5	32.2	0.0138	36.5	10.3	0.0081	44.1
60.00	23.0	34.0	30.7	0.0138	35.0	10.6	0.0058	42.0
250.00	23.0	30.0	26.7	0.0138	31.0	11.2	0.0029	36.5
1440.00	24.0	26.0	23.0	0.0136	27.0	11.9	0.0012	31.4

Fractional Components

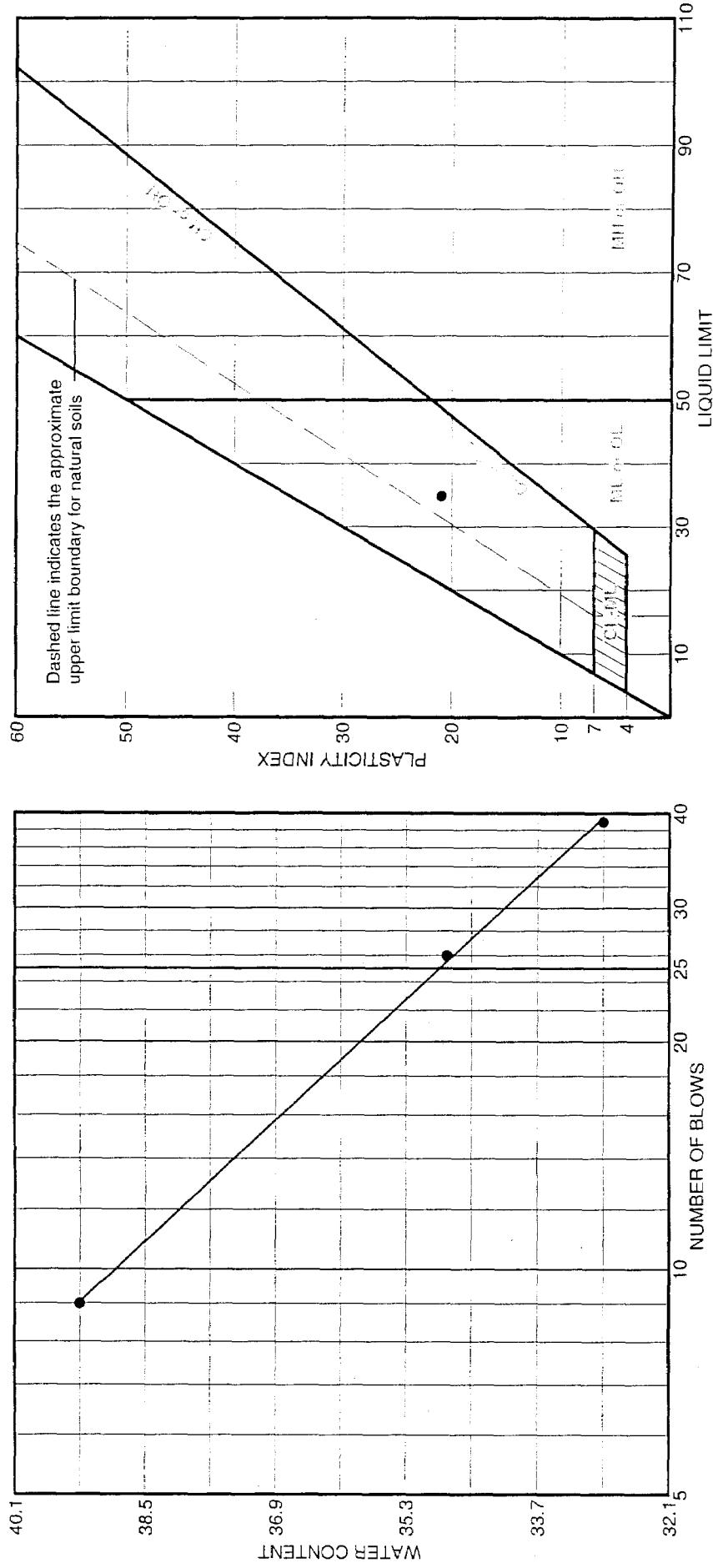
Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL = 4.0 (% coarse = % fine = 4.0)
% SAND = 34.9 (% coarse = 1.2 % medium = 4.2 % fine = 29.5)
% SILT = 20.3 % CLAY = 40.8

D₈₅= 0.26 D₆₀= 0.04 D₅₀= 0.01

LIQUID AND PLASTIC LIMITS TEST REPORT



● Sample # IRA17707PR sampled May 15th, 2003. Borehole #7 North

Lab Log #025

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17707PR

Elev. or Depth: 23.0' - 24.5'

Sample Length (in./cm.): LL #025

Location:

Description: Sandy lean clay

Date: 6/9/03 Natural Moisture: 17.3%

USCS Class.: CL

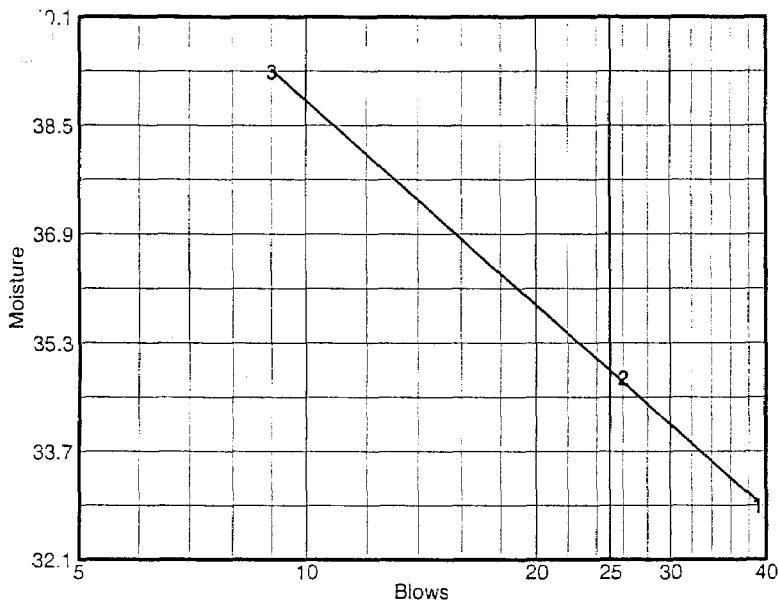
AASHTO Class.: A-6(10)

Testing Remarks: Sample #1RA17707PR sampled May 15th, 2003. Borehole #7 North

Lab Log #025

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	22.88	23.03	24.71			
Dry+Tare	19.97	19.95	20.87			
Tare	11.12	11.10	11.09			
# Blows	39	26	9			
Moisture	32.9	34.8	39.3			

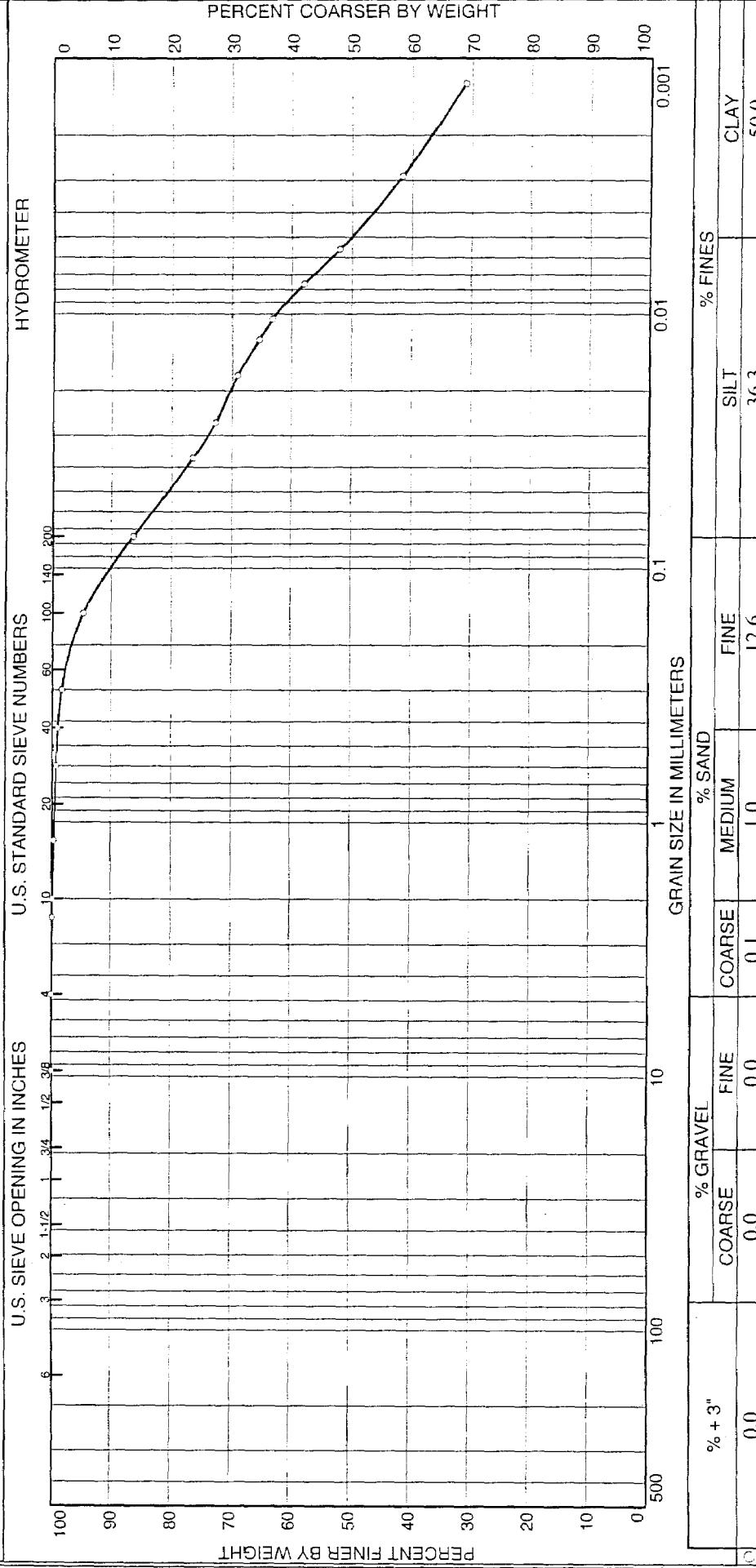


Liquid Limit= 34.9
 Plastic Limit= 14.0
 Plasticity Index= 20.9

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	7.44	7.57		
Dry+Tare	7.06	7.17		
Tare	4.33	4.36		
Moisture	13.9	14.2		

PARTICLE SIZE DISTRIBUTION TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D&D TSF 06-26 soils	1.5 - 3.0	6/10/03	CL	Lean clay		10.1%	31.6	16.0

Sample #1RΛ1760) IPR sampled May 14th, 2003, Borchol
#1 South.

Lab Log #032

INEEL MATERIALS LAB

Project No. _____ Plate _____

GRAIN SIZE DISTRIBUTION TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17601PR

Elev. or Depth: 1.5' - 3.0'

Location:

Description: Lean clay

Date: 6/10/03

Liquid Limit: 31.6

Testing Remarks: Sample #1RA17601PR sampled May 14th, 2003. Borehole #1 South.

Sample Length (in./cm.): LL #032

Natural Moisture: 10.1%

Plastic Limit: 16.0 USCS Class.: CL

Lab Log #032

Mechanical Analysis Data

Initial

Dry sample and tare= 486.91

Tare = 105.32

Dry sample weight = 381.59

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.36	0.00	99.9
# 10	0.08	0.00	99.9
# 16	1.06	0.00	99.6
# 30	1.53	0.00	99.2
# 40	1.11	0.00	98.9
# 50	2.80	0.00	98.2
# 100	13.56	0.00	94.6
# 200	31.72	0.00	86.3

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 99.9

Weight of hydrometer sample: 71.02

Hygroscopic moisture correction:

Moist weight & tare = 491.62

Dry weight & tare = 486.91

Tare = 105.32

Hygroscopic moisture= 1.2 %

Calculated biased weight= 70.22

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	55.0	51.7	0.0138	56.0	7.1	0.0368	76.4
2.00	23.0	52.5	49.2	0.0138	53.5	7.5	0.0268	72.7
5.00	23.0	50.0	46.7	0.0138	51.0	7.9	0.0174	69.0
10.00	23.0	47.5	44.2	0.0138	48.5	8.3	0.0126	65.3
15.00	23.0	46.0	42.7	0.0138	47.0	8.6	0.0104	63.1
30.00	23.0	42.5	39.2	0.0138	43.5	9.2	0.0076	57.9
60.00	23.0	38.5	35.2	0.0138	39.5	9.8	0.0056	52.0
250.00	23.0	31.5	28.2	0.0138	32.5	11.0	0.0029	41.6
1440.00	24.0	24.0	21.0	0.0136	25.0	12.2	0.0013	31.0

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

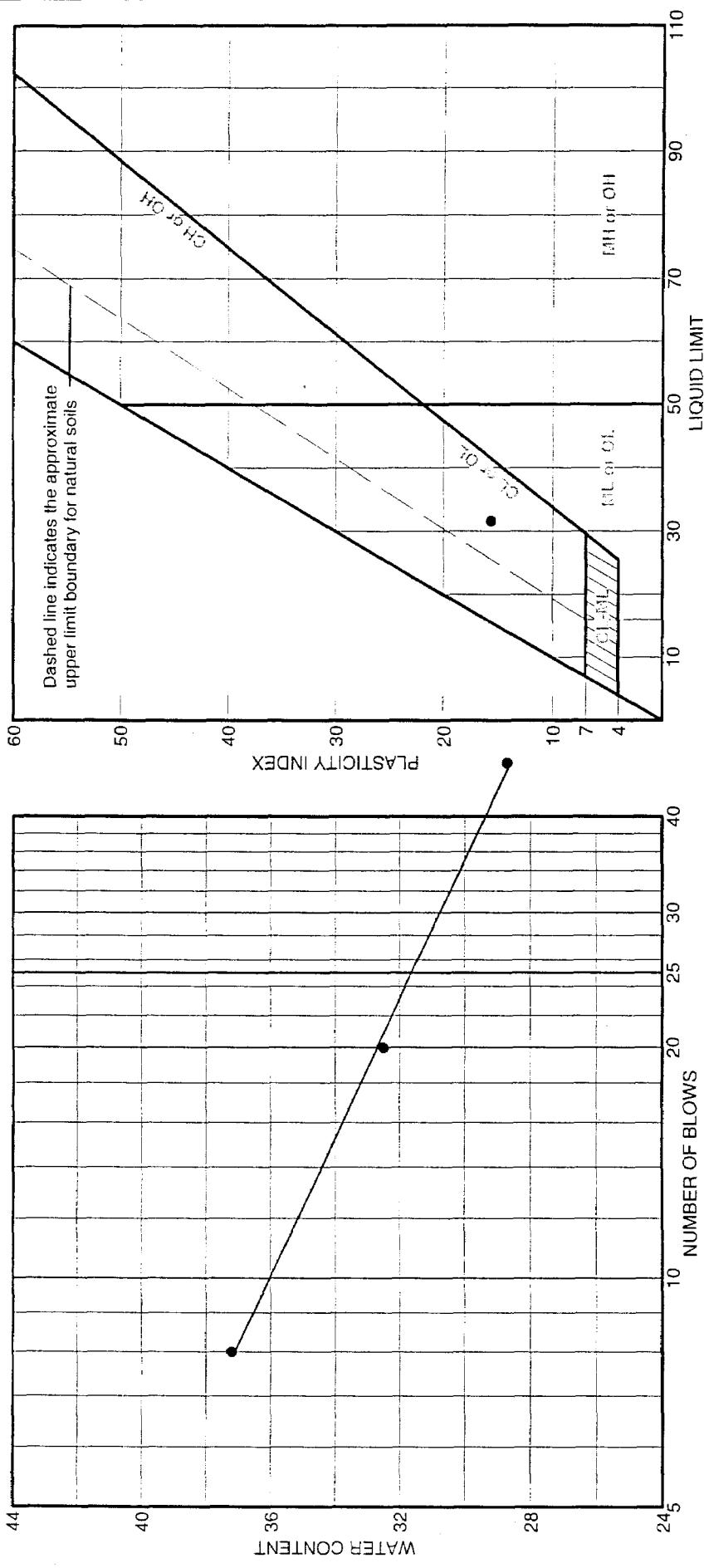
% + 3" = % GRAVEL =

% SAND = 13.7 (% coarse = 0.1 % medium = 1.0 % fine = 12.6)

% SILT = 36.3 % CLAY = 50.0

D85= 0.07 D60= 0.01 D50= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
D & D TSF 06-26 soils		1.5' - 3.0'	6/10/03	CL	Lean clay	10.1%	31.6	15.6

- Sample #IRAI7601PR sampled May 14th, 2003. Borehole #1 South. Lab Log #032

INEEL MATERIALS LAB

Client	
Project	
Project No.	Plate

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17601PR

Elev. or Depth: 1.5' - 3.0'

Sample Length (in./cm.): LL #032

Location:

Description: Lean clay

Date: 6/10/03 **Natural Moisture:** 10.1%

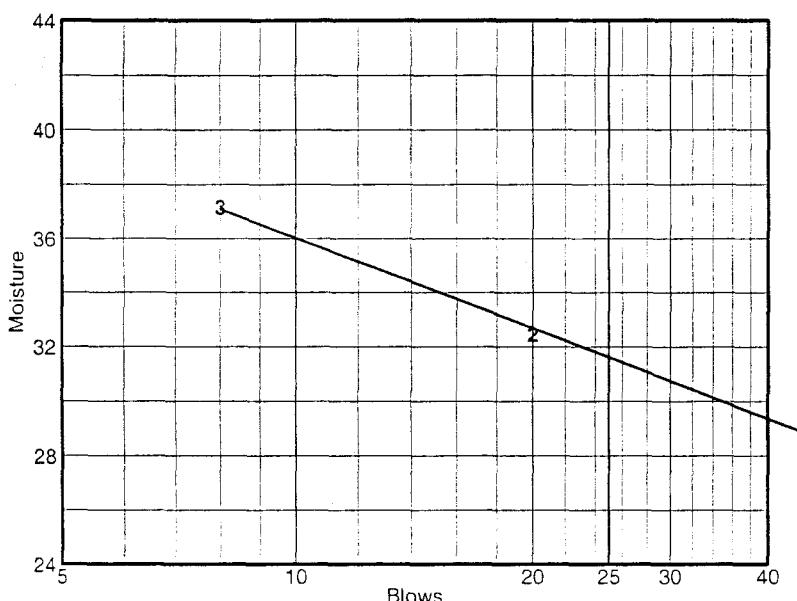
USCS Class.: CL

AASHTO Class.: A-6(12)

Testing Remarks: Sample #1RA17601PR sampled May 14th, 2003. Borehole #1 South.
Lab Log #032

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.75	24.67	25.01			
Dry+Tare	21.70	21.33	21.25			
Tare	11.07	11.06	11.13			
# Blows	47	20	8			
Moisture	28.7	32.5	37.2			

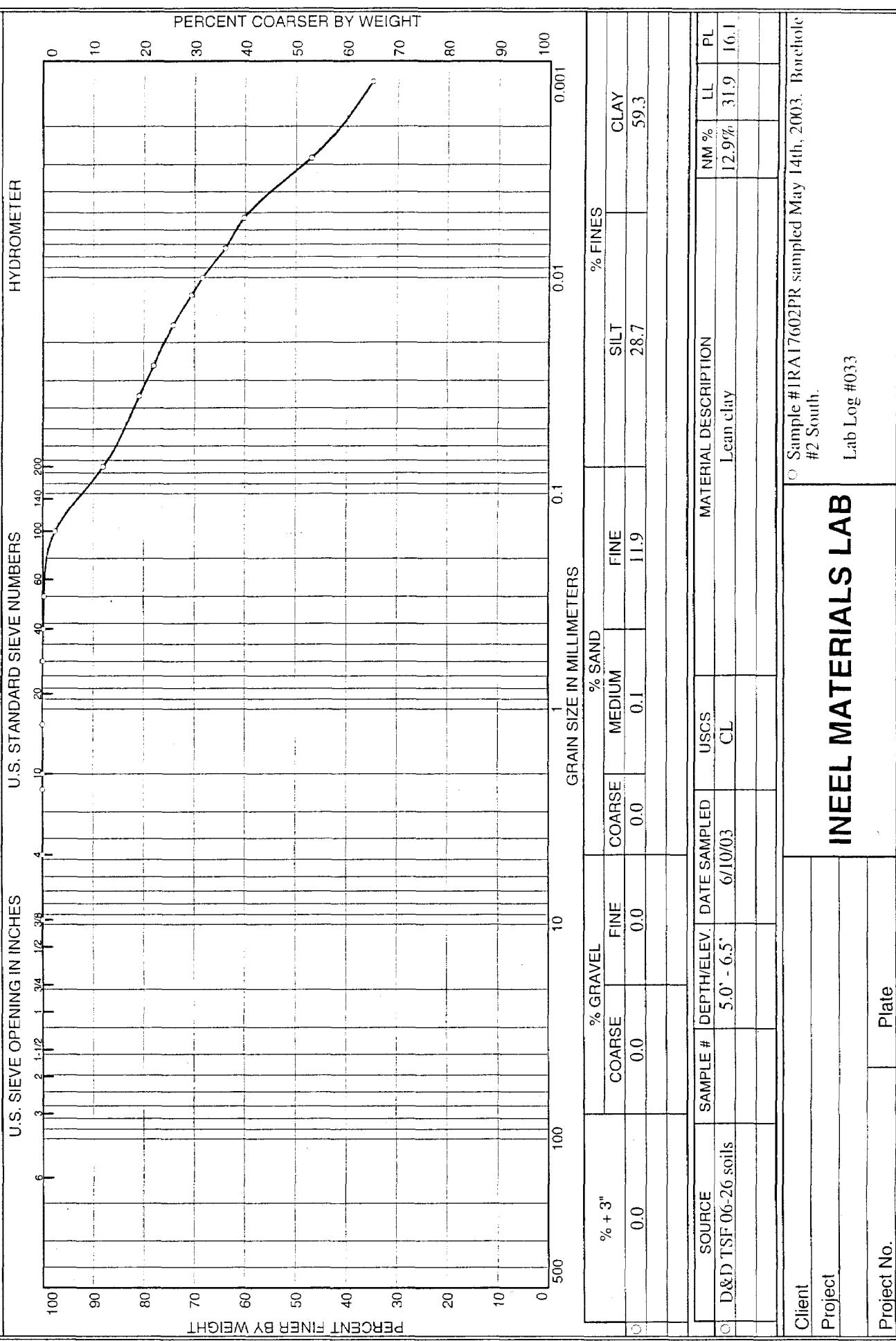


Liquid Limit= 31.6
 Plastic Limit= 16.0
 Plasticity Index= 15.6

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	9.62	9.41		
Dry+Tare	8.89	8.70		
Tare	4.30	4.31		
Moisture	15.9	16.2		

PARTICLE SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17602PR

Elev. or Depth: 5.0' - 6.5'

Sample Length (in./cm.): LL #033

Location:

Description: Lean clay

Date: 6/10/03

Natural Moisture: 12.9%

Liquid Limit: 31.9

Plastic Limit: 16.1

USCS Class.: CL

Testing Remarks: Sample #1RA17602PR sampled May 14th, 2003. Borehole #2 South.

Lab Log #033

Mechanical Analysis Data

Initial

Dry sample and tare= 380.60

Tare = 106.36

Dry sample weight = 274.24

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.00	0.00	100.0
# 16	0.03	0.00	100.0
# 30	0.06	0.00	100.0
# 40	0.15	0.00	99.9
# 50	0.58	0.00	99.7
# 100	6.03	0.00	97.5
# 200	26.04	0.00	88.0

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 100.0

Weight of hydrometer sample: 71.70

Hygroscopic moisture correction:

Moist weight & tare = 386.01

Dry weight & tare = 380.60

Tare = 106.36

Hygroscopic moisture= 2.0 %

Calculated biased weight= 70.31

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.5	58.0	54.8	0.0137	59.0	6.6	0.0353	80.9
2.00	23.5	56.0	52.8	0.0137	57.0	6.9	0.0256	78.0
5.00	23.5	53.5	50.3	0.0137	54.5	7.4	0.0166	74.3
10.00	23.5	51.0	47.8	0.0137	52.0	7.8	0.0121	70.6
15.00	23.5	49.5	46.3	0.0137	50.5	8.0	0.0100	68.4
30.00	23.5	46.5	43.3	0.0137	47.5	8.5	0.0073	63.9
60.00	23.5	44.0	40.8	0.0137	45.0	8.9	0.0053	60.2
250.00	23.5	35.0	31.8	0.0137	36.0	10.4	0.0028	47.0
1440.00	23.0	27.0	23.7	0.0138	28.0	11.7	0.0012	34.9

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

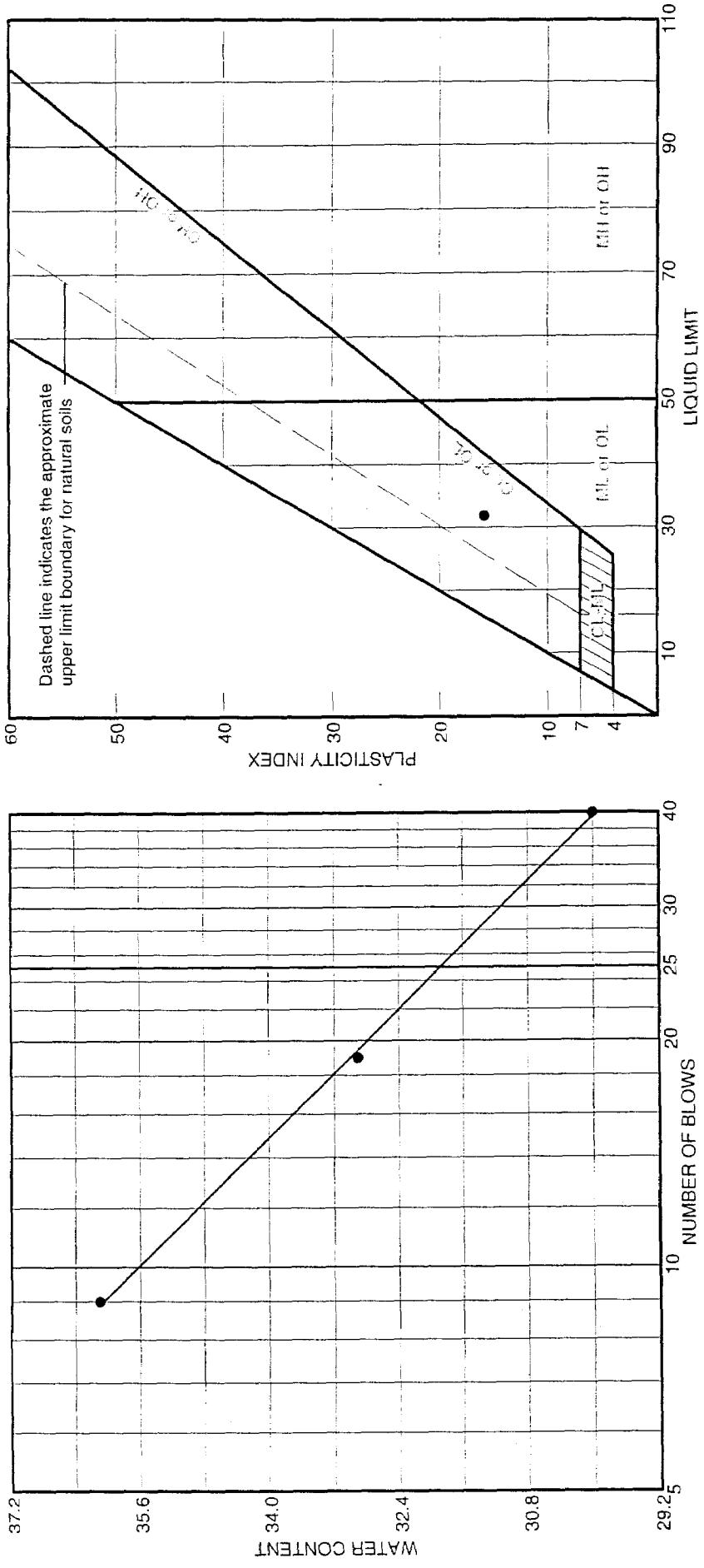
% + 3" = % GRAVEL =

% SAND = 12.0 (% coarse = 0.0 % medium = 0.1 % fine = 11.9)

% SILT = 28.7 % CLAY = 59.3

D₈₅= 0.06 D₆₀= 0.01 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
● D&DTSF 06-26 soils		5.0' - 6.5'	6/10/03	CL	Lean clay	12.9%	31.9	15.8

- Sample #IRΛ17602PR sampled May 14th, 2003. Borehole #2 South. Lab Log #033

INEEL MATERIALS LAB

Plate

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17602PR

Elev. or Depth: 5.0' - 6.5'

Sample Length (in./cm.): LL #033

Location:

Description: Lean clay

Date: 6/10/03 Natural Moisture: 12.9%

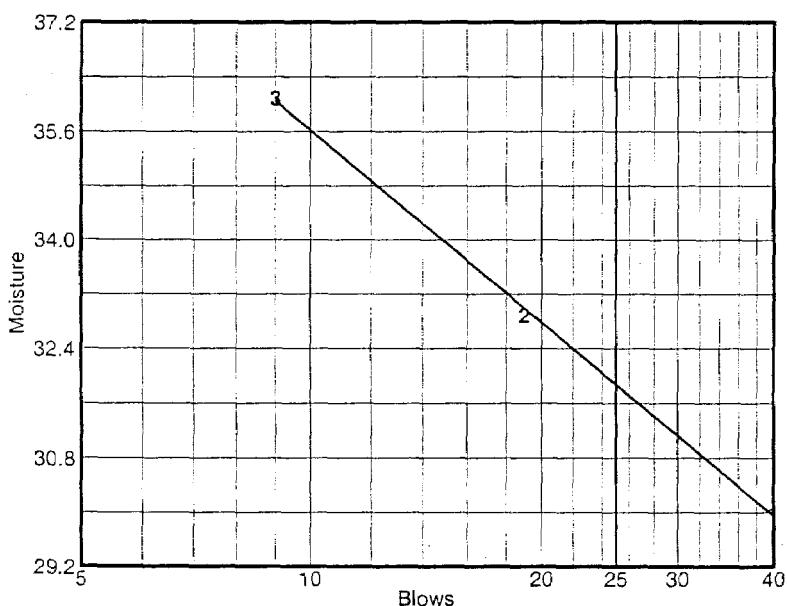
USCS Class.: CL

AASHTO Class.: A-6(13)

Testing Remarks: Sample #1RA17602PR sampled May 14th, 2003. Borehole #2 South.
Lab Log #033

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.52	28.09	30.32			
Dry+Tare	25.99	24.75	26.05			
Tare	14.24	14.60	14.23			
# Blows	40	19	9			
Moisture	30.0	32.9	36.1			

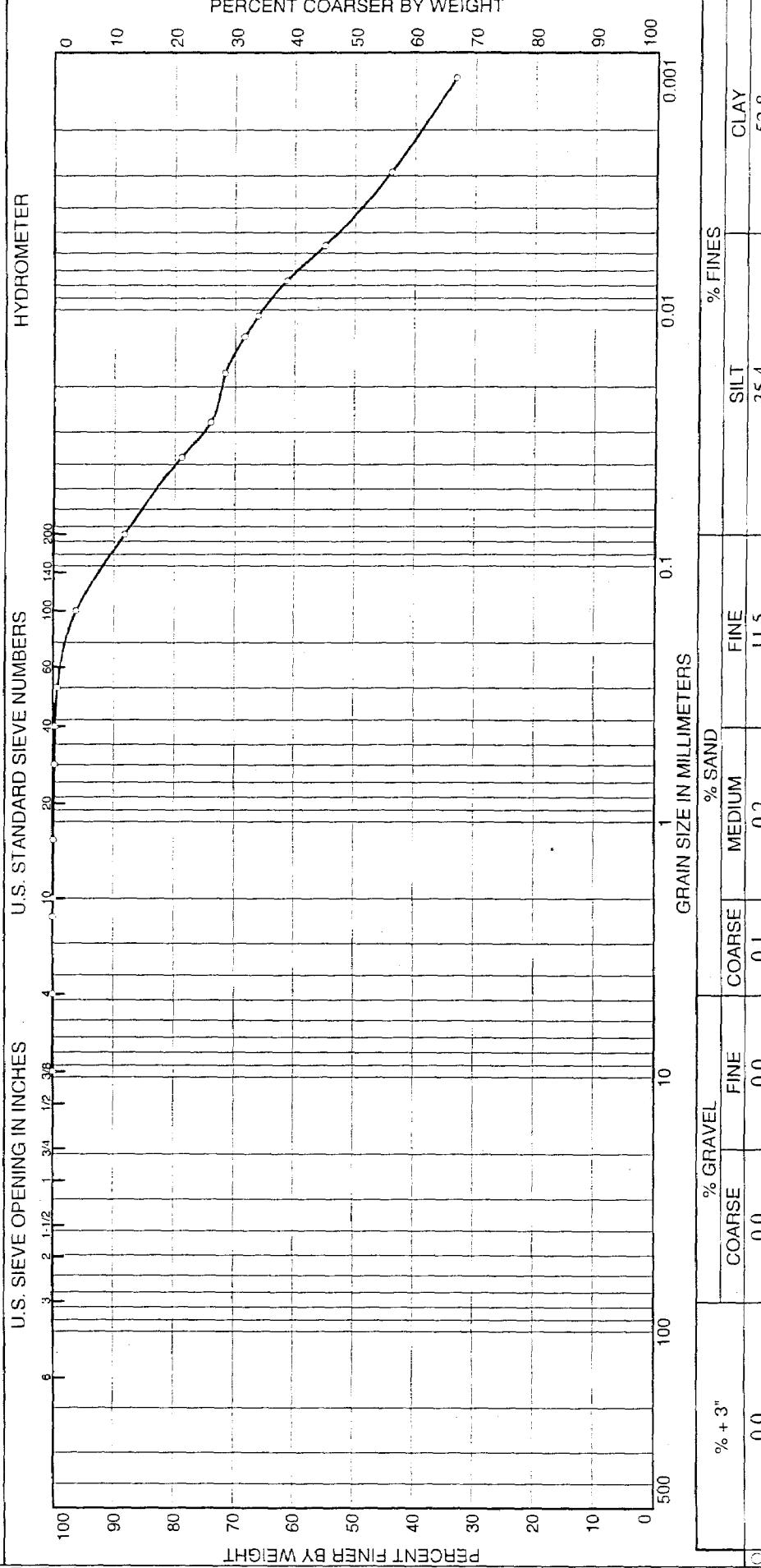


Liquid Limit = 31.9
Plastic Limit = 16.1
Plasticity Index = 15.8

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	8.73	8.64			
Dry+Tare	8.13	8.04			
Tare	4.39	4.36			
moisture	16.0	16.3			

PARTICLE SIZE DISTRIBUTION TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION
D&D TSF 06-26 soils		8.5' - 9.0'	6/10/03	CL	Lean clay

Client	○ Sample IRA17603PR sampled May 14th, 2003, Borehole #3 South,
Project	Lab Log #026
Project No.	Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17603PR

Elev. or Depth: 8.5' - 9.0'

Sample Length (in./cm.): LL #026

Location:

Description: Lean clay

Date: 6/10/03

Natural Moisture: 17.8%

Liquid Limit: 33.4

Plastic Limit: 17.0

USCS Class.: CL

Testing Remarks: Sample 1RA17603PR sampled May 14th, 2003. Borehole #3 South.

Lab Log #026

Mechanical Analysis Data

Initial

Dry sample and tare= 477.22

Tare = 113.95

Dry sample weight = 363.27

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.28	0.00	99.9
# 16	0.02	0.00	99.9
# 30	0.27	0.00	99.8
# 40	0.51	0.00	99.7
# 50	1.41	0.00	99.3
# 100	11.19	0.00	96.2
# 200	29.05	0.00	88.2

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 99.9

Weight of hydrometer sample: 66.26

Hygroscopic moisture correction:

Moist weight & tare = 482.05

Dry weight & tare = 477.22

Tare = 113.95

Hygroscopic moisture= 1.3 %

Calculated biased weight= 65.46

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	53.0	49.7	0.0138	54.0	7.4	0.0376	78.8
2.00	23.0	50.0	46.7	0.0138	51.0	7.9	0.0275	74.0
5.00	23.0	48.5	45.2	0.0138	49.5	8.2	0.0176	71.6
10.00	23.0	46.5	43.2	0.0138	47.5	8.5	0.0127	68.4
15.00	23.0	45.0	41.7	0.0138	46.0	8.8	0.0105	66.1
30.00	23.0	42.0	38.7	0.0138	43.0	9.2	0.0077	61.3
60.00	23.0	38.0	34.7	0.0138	39.0	9.9	0.0056	55.0
250.00	23.0	31.0	27.7	0.0138	32.0	11.0	0.0029	43.9
1440.00	24.0	24.0	21.0	0.0136	25.0	12.2	0.0013	33.2

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

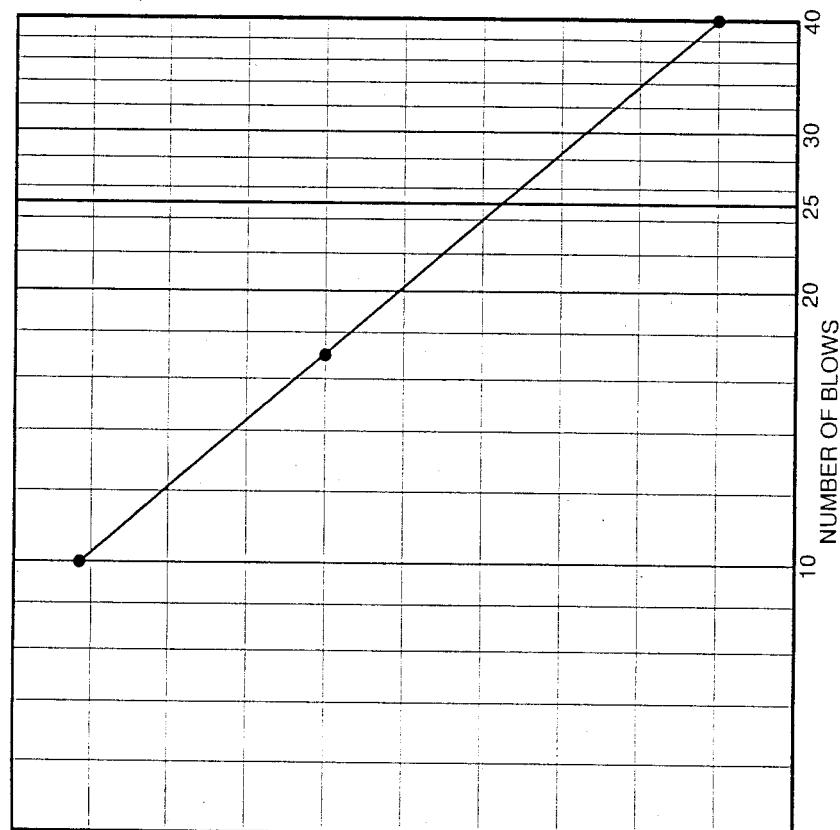
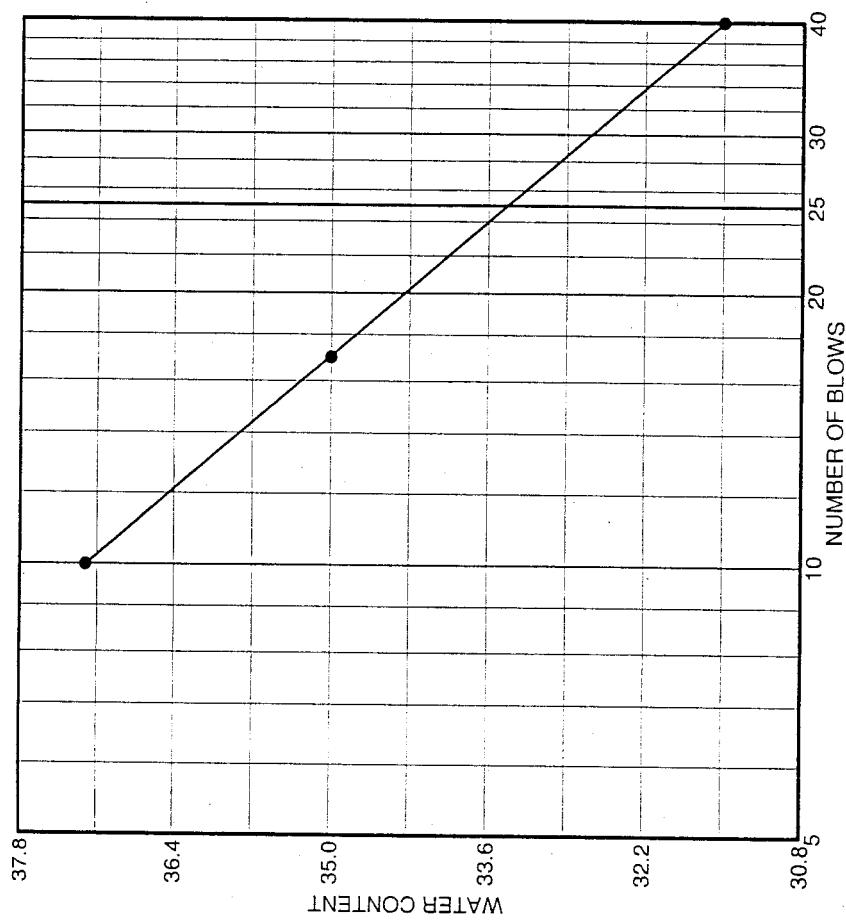
% + 3" = % GRAVEL =

% SAND = 11.8 (% coarse = 0.1 % medium = 0.2 % fine = 11.5)

% SILT = 35.4 % CLAY = 52.8

D₈₅= 0.06 D₆₀= 0.01 D₅₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



Sample #IR17603PR sampled May 14th, 2003. Borehole
#3 South.
1.ab Log #026

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17603PR

Elev. or Depth: 8.5' - 9.0'

Sample Length (in./cm.): LL #026

Location:

Description: Lean clay

Date: 6/10/03 Natural Moisture: 17.8%

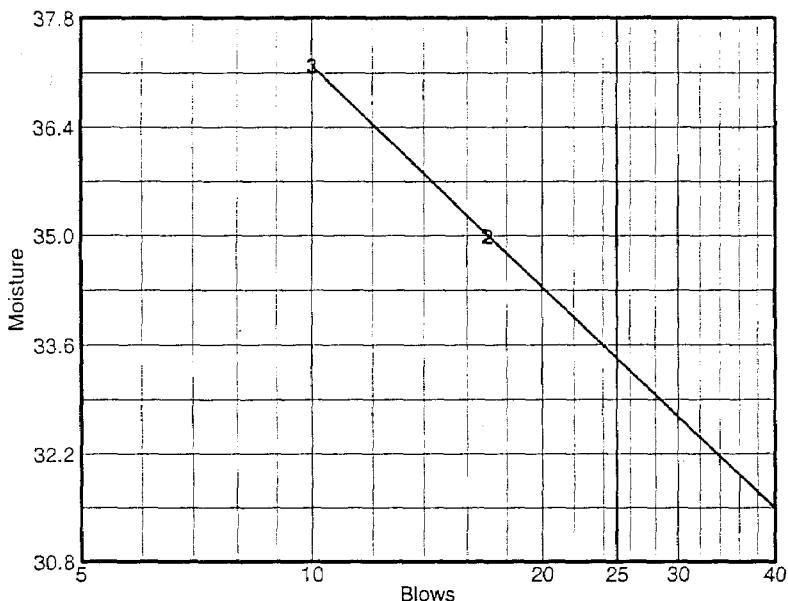
USCS Class.: CL

AASHTO Class.: A-6(13)

Testing Remarks: Sample #1RA17603PR sampled May 14th, 2003. Borehole #3 South.
Lab Log #026

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.03	23.48	25.11			
Dry+Tare	20.94	20.28	21.32			
Tare	11.13	11.13	11.14			
# Blows	40	17	10			
Moisture	31.5	35.0	37.2			

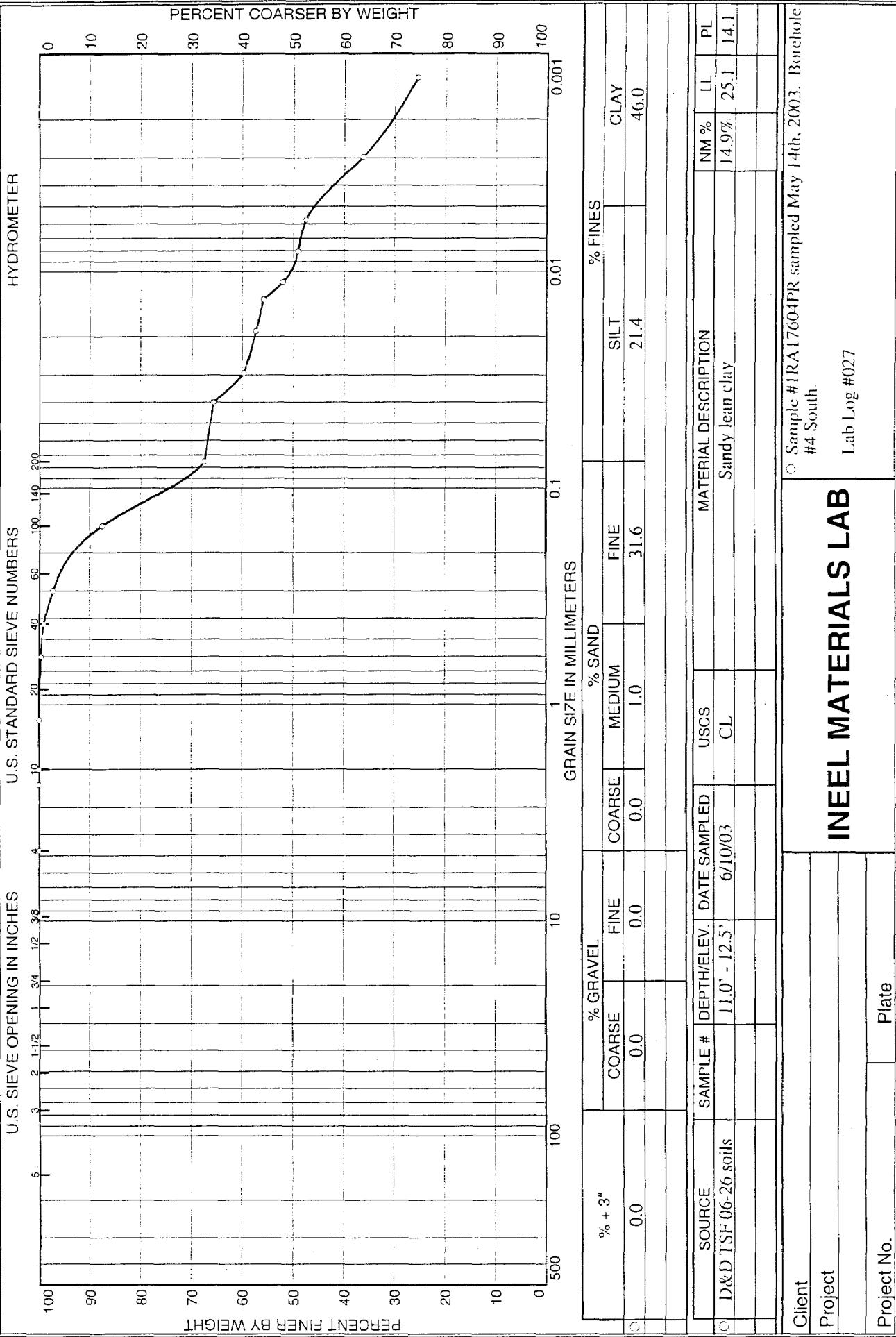


Liquid Limit= 33.4
Plastic Limit= 17.0
Plasticity Index= 16.4

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	10.88	9.58		
Dry+Tare	9.93	8.81		
Tare	4.34	4.32		
Moisture	17.0	17.1		

PARTICLE SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17604PR

Elev. or Depth: 11.0' - 12.5'

Sample Length (in./cm.): LL #027

Location:

Description: Sandy lean clay

Date: 6/10/03

Natural Moisture: 14.9%

Liquid Limit: 25.1

Plastic Limit: 14.1

USCS Class.: CL

Testing Remarks: Sample #1RA17604PR sampled May 14th, 2003. Borehole #4 South.

Lab Log #027

Mechanical Analysis Data

Initial

Dry sample and tare= 373.95

Tare = 104.87

Dry sample weight = 269.08

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.00	0.00	100.0
# 16	0.08	0.00	100.0
# 30	0.96	0.00	99.6
# 40	1.66	0.00	99.0
# 50	4.96	0.00	97.2
# 100	25.91	0.00	87.5
# 200	54.23	0.00	67.4

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 100.0

Weight of hydrometer sample: 70.41

Hygroscopic moisture correction:

Moist weight & tare = 378.96

Dry weight & tare = 373.95

Tare = 104.87

Hygroscopic moisture= 1.9 %

Calculated biased weight= 69.12

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	47.0	43.7	0.0138	48.0	8.4	0.0400	65.6
2.00	23.0	43.0	39.7	0.0138	44.0	9.1	0.0294	59.6
5.00	23.0	41.5	38.2	0.0138	42.5	9.3	0.0188	57.3
10.00	23.0	40.5	37.2	0.0138	41.5	9.5	0.0134	55.8
15.00	23.0	38.0	34.7	0.0138	39.0	9.9	0.0112	52.1
30.00	23.0	36.0	32.7	0.0138	37.0	10.2	0.0081	49.1
60.00	23.0	35.0	31.7	0.0138	36.0	10.4	0.0057	47.6
250.00	23.0	27.5	24.2	0.0138	28.5	11.6	0.0030	36.3
1440.00	24.0	20.0	17.0	0.0136	21.0	12.9	0.0013	25.5

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL =

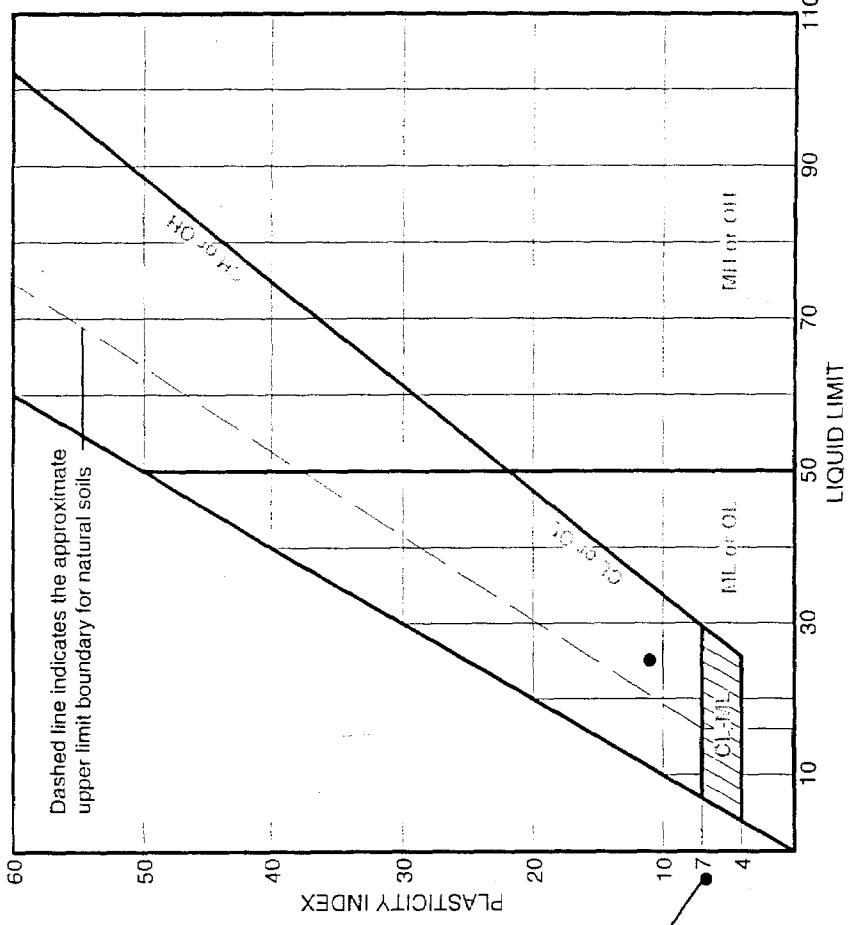
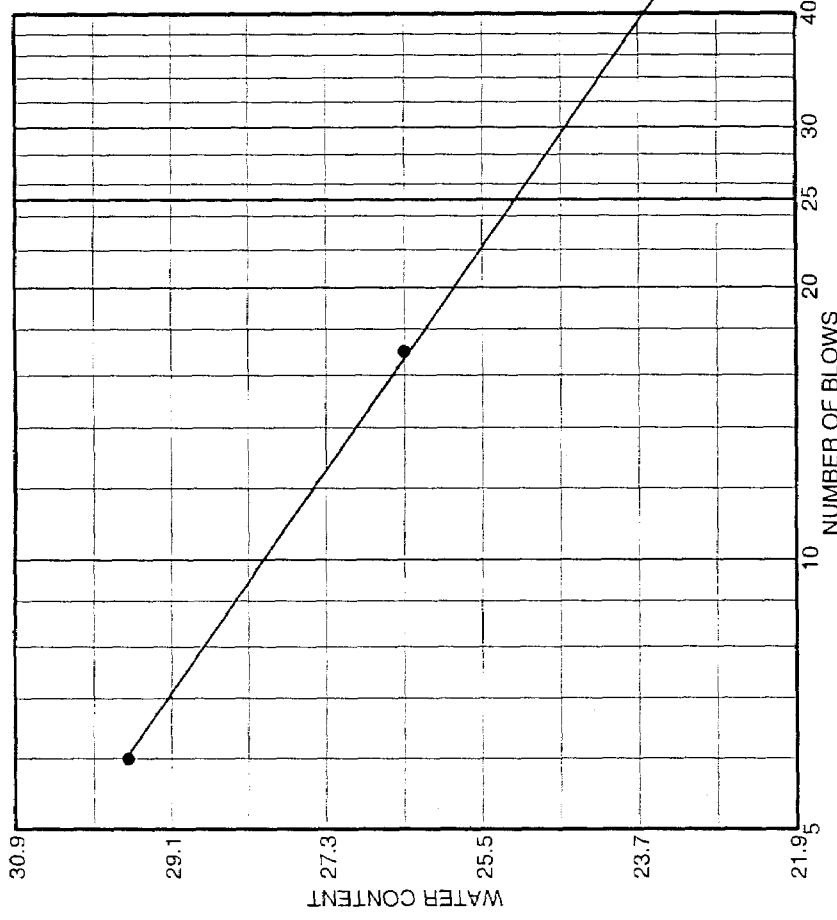
% SAND = 32.6 (% coarse = 0.0 % medium = 1.0 % fine = 31.6)

% SILT = 21.4 % CLAY = 46.0

D₈₅= 0.14 D₆₀= 0.03 D₅₀= 0.01

D₃₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
● D&D TSF 06-26 soils		11.0' - 12.5'	6/10/03	CL	Sandy lean clay	14.9%	25.1	11.0

● Sample #1RA17604PR sampled May 14th, 2003. Borehole #4 south.
Lab Log #027

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17604PR

Elev. or Depth: 11.0' - 12.5'

Sample Length (in./cm.): LL #027

Location:

Description: Sandy lean clay

Date: 6/10/03 **Natural Moisture:** 14.9%

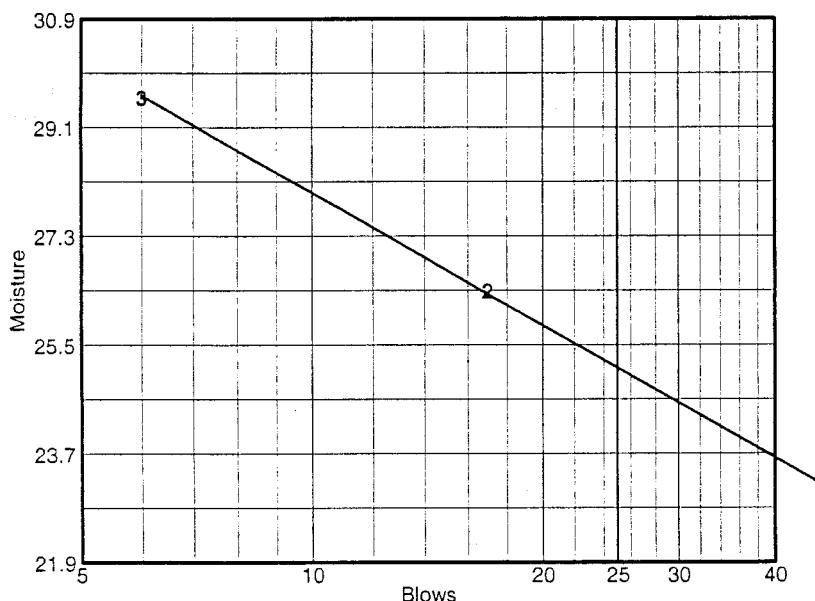
USCS Class.: CL

AASHTO Class.: A-6(5)

Testing Remarks: Sample #1RA17604PR sampled May 14th, 2003. Borehole #4 south.
Lab Log #027

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	31.89	27.93	27.78			
Dry+Tare	28.62	25.08	24.65			
Tare	14.35	14.29	14.09			
# Blows	50	17	6			
Moisture	22.9	26.4	29.6			

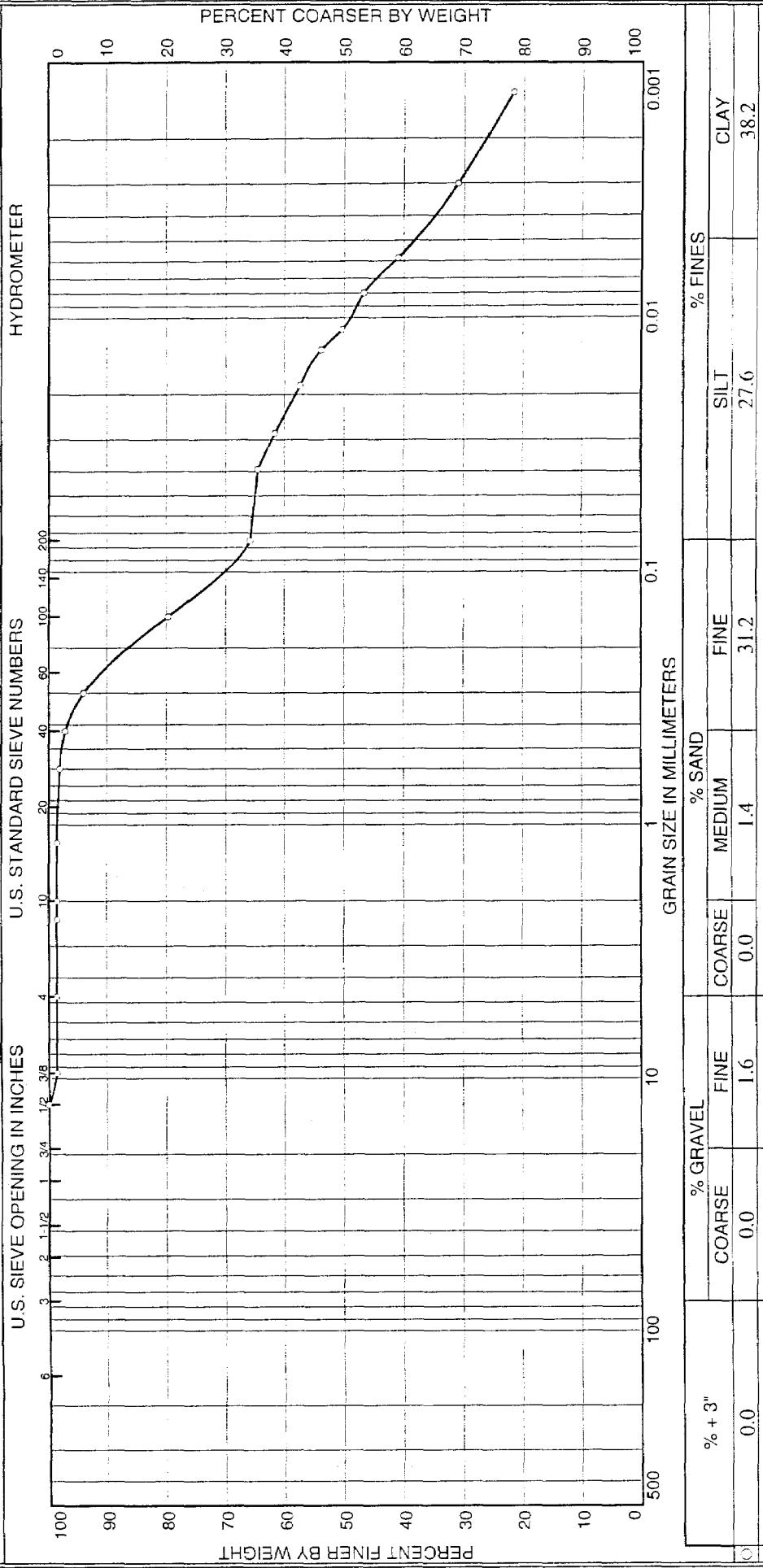


Liquid Limit= 25.1
Plastic Limit= 14.1
Plasticity Index= 11.0

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	8.51	8.77		
Dry+Tare	8.00	8.21		
Tare	4.33	4.29		
Moisture	13.9	14.3		

PARTICLE SIZE DISTRIBUTION TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D&D TSF 06-26 soils		14.0' - 16.5'	6/10/03	CL	Sandy loam clay	16.8%	23.4	14.3

Sample #1R\17605PR sampled May 14th, 2003. Borehole #5 South.

Lab Log #028

INEEL MATERIALS LAB

Project No. _____ Plate _____

GRAIN SIZE DISTRIBUTION TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17605PR

Elev. or Depth: 14.0' - 16.5'

Sample Length (in./cm.): LL #028

Location:

Description: Sandy lean clay

Date: 6/10/03

Natural Moisture: 16.8%

Liquid Limit: 23.4

Plastic Limit: 14.3

USCS Class.: CL

Testing Remarks: Sample #1RA17605PR sampled May 14th, 2003. Borehole #5 South.

Lab Log #028

Mechanical Analysis Data

Initial

Dry sample and tare= 388.30

Tare = 105.73

Dry sample weight = 282.57

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
1/2 inch	0.00	0.00	100.0
3/8 inch	4.42	0.00	98.4
4	0.00	0.00	98.4
# 8	0.00	0.00	98.4
# 10	0.07	0.00	98.4
# 16	0.10	0.00	98.4
# 30	1.37	0.00	97.9
# 40	2.42	0.00	97.0
# 50	9.20	0.00	93.8
# 100	39.92	0.00	79.7
# 200	39.11	0.00	65.8

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 98.4

Weight of hydrometer sample: 73.19

Hygroscopic moisture correction:

Moist weight & tare = 393.98

Dry weight & tare = 388.30

Tare = 105.73

Hygroscopic moisture= 2.0 %

Calculated biased weight= 72.91

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.5	48.5	45.3	0.0137	49.5	8.2	0.0392	64.5
2.00	23.5	46.5	43.3	0.0137	47.5	8.5	0.0283	61.6
5.00	23.5	43.5	40.3	0.0137	44.5	9.0	0.0184	57.4
10.00	23.5	41.0	37.8	0.0137	42.0	9.4	0.0133	53.8
15.00	23.5	38.5	35.3	0.0137	39.5	9.8	0.0111	50.3
30.00	23.5	36.0	32.8	0.0137	37.0	10.2	0.0080	46.7
60.00	23.5	32.0	28.8	0.0137	33.0	10.9	0.0058	41.0
250.00	23.5	25.0	21.8	0.0137	26.0	12.0	0.0030	31.0
1440.00	23.0	18.5	15.2	0.0138	19.5	13.1	0.0013	21.6

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL = 1.6 (% coarse = % fine = 1.6)

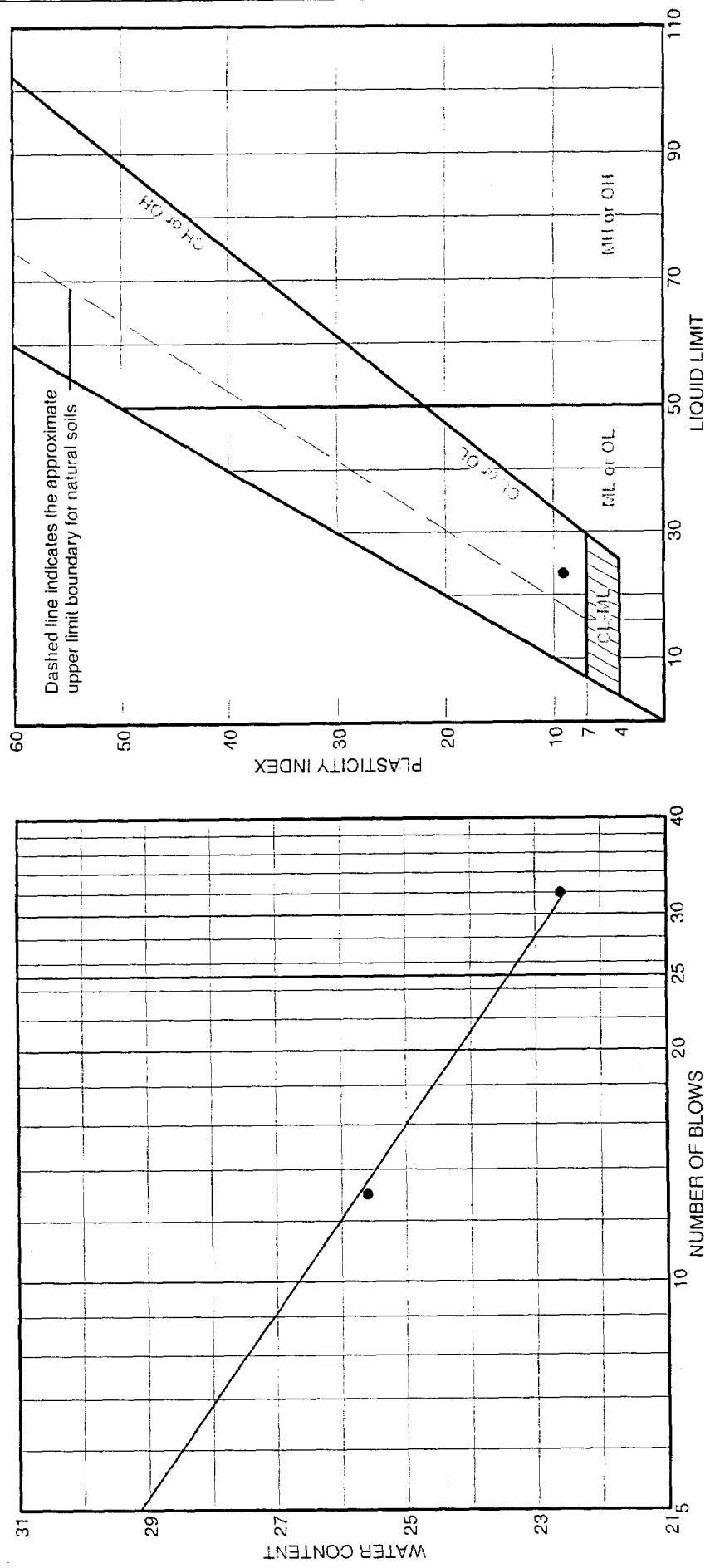
% SAND = 32.6 (% coarse = 0.0 % medium = 1.4 % fine = 31.2)

% SILT = 27.6 % CLAY = 38.2

D₈₅= 0.19 D₆₀= 0.02 D₅₀= 0.01

D₃₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
● D&DTSF 06-26 soils		14.0' - 16.5'	6/10/03	CL	Sandy lean clay	16.8%	23.4	9.1

● Sample #IRAI7605PR sampled May 14th, 2003. Borehole #5 South. Lab Log #028

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17605PR

Elev. or Depth: 14.0' - 16.5'

Sample Length (in./cm.): LL #028

Location:

Description: Sandy lean clay

Date: 6/10/03 **Natural Moisture:** 16.8%

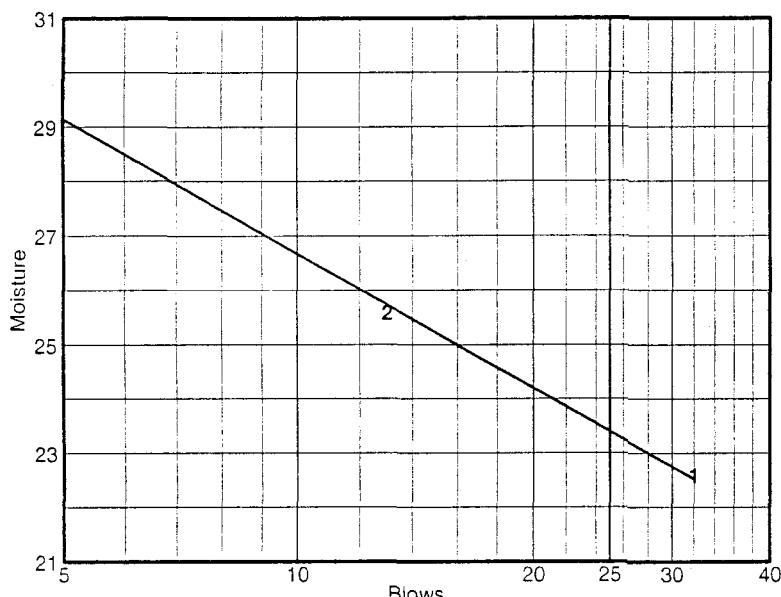
USCS Class.: CL

AASHTO Class.: A-4(3)

Testing Remarks: Sample #1RA17605PR sampled May 14th, 2003. Borehole #5 South.
Lab Log #028

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	31.66	30.50	30.91			
Dry+Tare	28.44	27.17	27.09			
Tare	14.20	14.14	14.34			
# Blows	32	13	4			
Moisture	22.6	25.6	30.0			

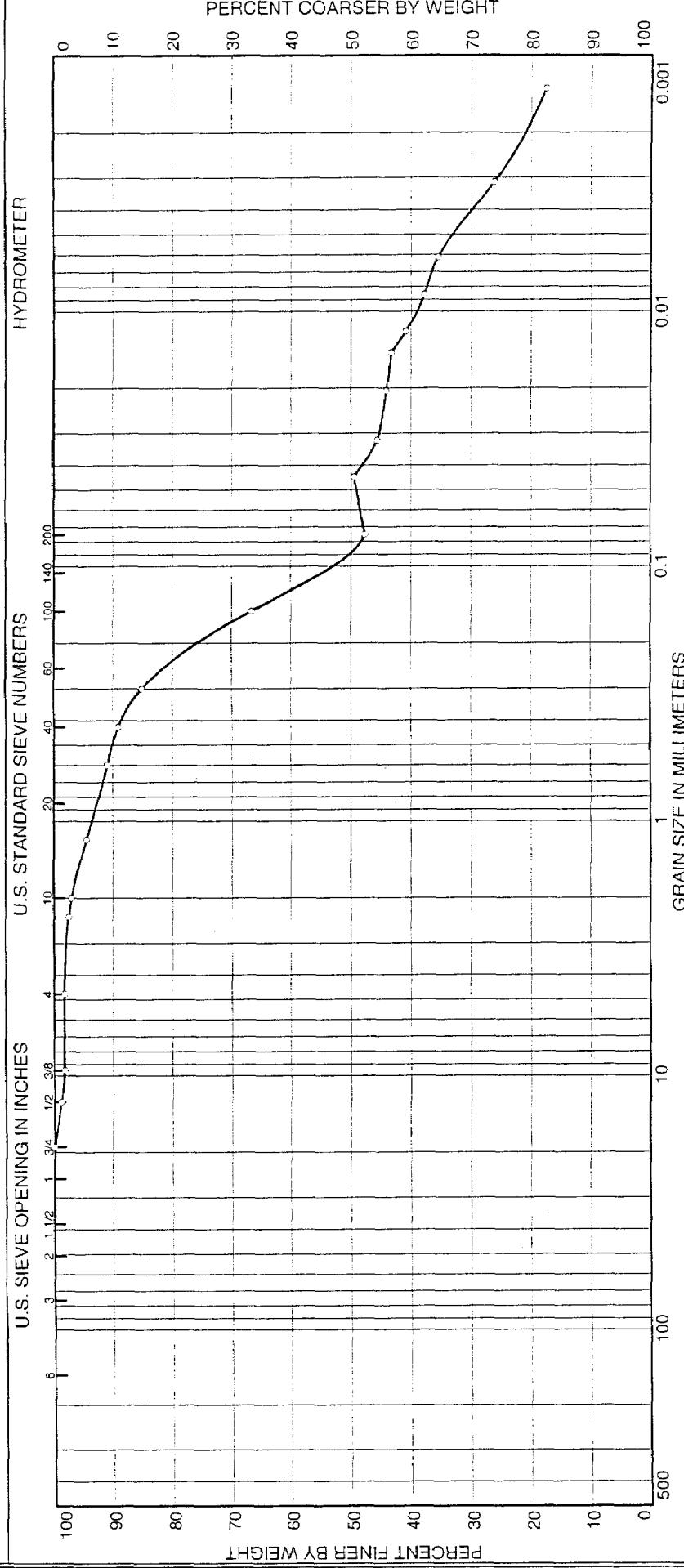


Liquid Limit= 23.4
 Plastic Limit= 14.3
 Plasticity Index= 9.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	23.31	24.63		
Dry+Tare	22.48	23.75		
Tare	16.72	17.55		
Moisture	14.4	14.2		

PARTICLE SIZE DISTRIBUTION TEST REPORT



Sample #1RA17606PR sampled May 14th, 2003. Borehole #6 South.

Lab Log #029

INEEL MATERIALS LAB

Client
Project

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17606PR

Elev. or Depth: 17.0' - 18.5'

Sample Length (in./cm.): LL #029

Location:

Description: Clayey sand

Date: 6/10/03

Natural Moisture: 12.3%

Liquid Limit: 21.9

Plastic Limit: 13.8

USCS Class.: SC

Testing Remarks: Sample #1RA17606PR sampled May 14th, 2003. Borehole #6 South.

Lab Log #029

Mechanical Analysis Data

Initial

Dry sample and tare= 459.96

Tare = 106.10

Dry sample weight = 353.86

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/4 inch	0.00	0.00	100.0
1/2 inch	4.58	0.00	98.7
/8 inch	2.31	0.00	98.1
# 4	0.00	0.00	98.1
# 8	2.39	0.00	97.4
# 10	1.72	0.00	96.9
# 16	8.90	0.00	94.4
# 30	12.26	0.00	90.9
# 40	6.48	0.00	89.1
# 50	14.09	0.00	85.1
# 100	64.95	0.00	66.7
# 200	67.29	0.00	47.7

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 96.9

Weight of hydrometer sample: 64.95

Hygroscopic moisture correction:

Moist weight & tare = 463.62

Dry weight & tare = 459.96

Tare = 106.10

Hygroscopic moisture= 1.0 %

Calculated biased weight= 66.34

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Miscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	35.0	31.7	0.0138	36.0	10.4	0.0445	49.5
2.00	23.0	32.5	29.2	0.0138	33.5	10.8	0.0321	45.6
5.00	23.0	31.5	28.2	0.0138	32.5	11.0	0.0204	44.1
10.00	23.0	31.0	27.7	0.0138	32.0	11.0	0.0145	43.3
15.00	23.0	29.5	26.2	0.0138	30.5	11.3	0.0120	40.9
30.00	23.0	27.5	24.2	0.0138	28.5	11.6	0.0086	37.8
60.00	23.0	26.0	22.7	0.0138	27.0	11.9	0.0061	35.5
250.00	23.0	20.0	16.7	0.0138	21.0	12.9	0.0031	26.1
1440.00	23.0	14.5	11.2	0.0138	15.5	13.8	0.0013	17.5

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL = 1.9 (% coarse = % fine = 1.9)

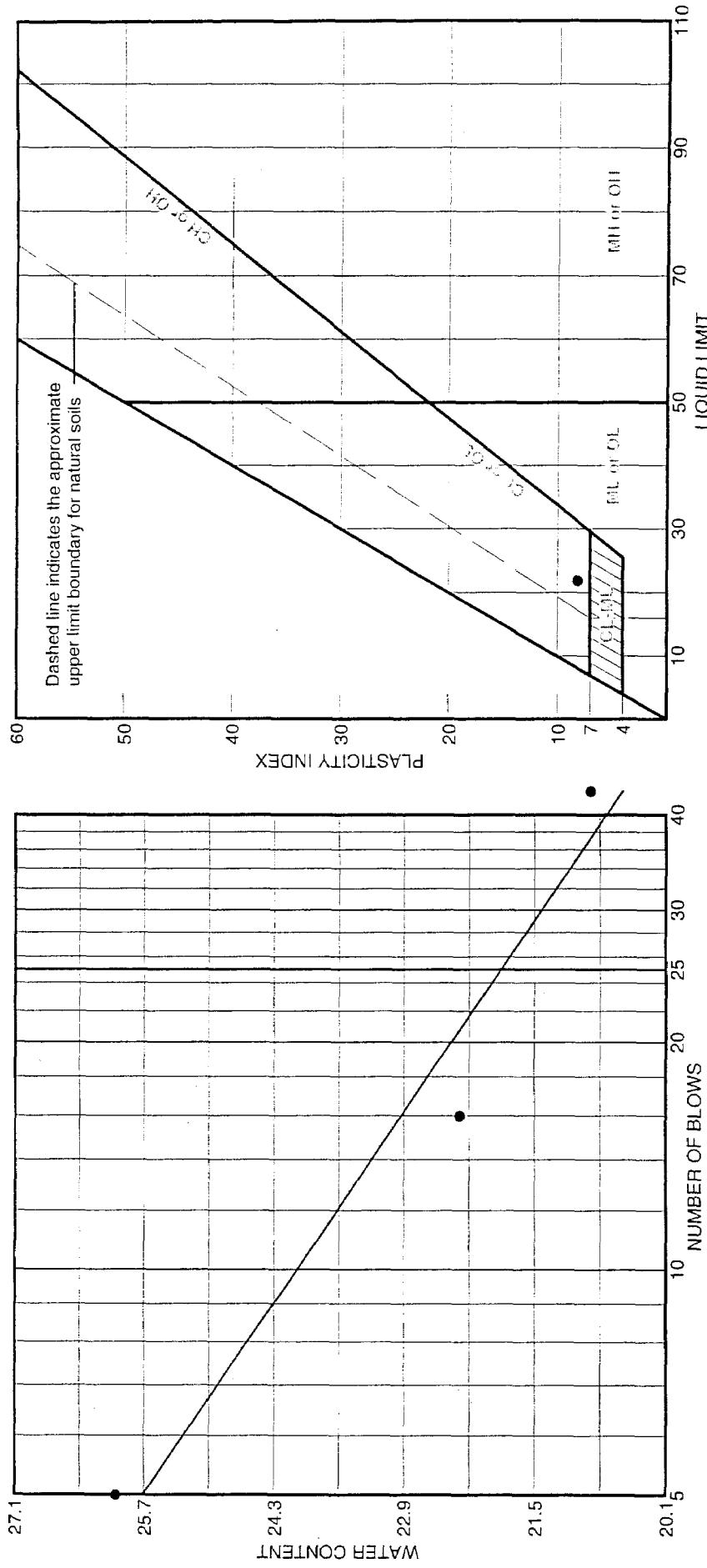
% SAND = 50.4 (% coarse = 1.2 % medium = 7.8 % fine = 41.4)

% SILT = 14.6 % CLAY = 33.1

D₈₅= 0.30 D₆₀= 0.12 D₅₀= 0.09

D₃₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
D&DTSF 06-26 soils		17.0' - 18.5'	6/10/03	SC	Clayey sand	12.3%	21.9	8.1

Sample #1RA17606PR sampled May 14th, 2003. Borchole
#6 South.
Lab Log #029

INEEL MATERIALS LAB

Client
Project

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17606PR

Elev. or Depth: 17.0' - 18.5'

Sample Length (in./cm.): LL #029

Location:

Description: Clayey sand

Date: 6/10/03 **Natural Moisture:** 12.3%

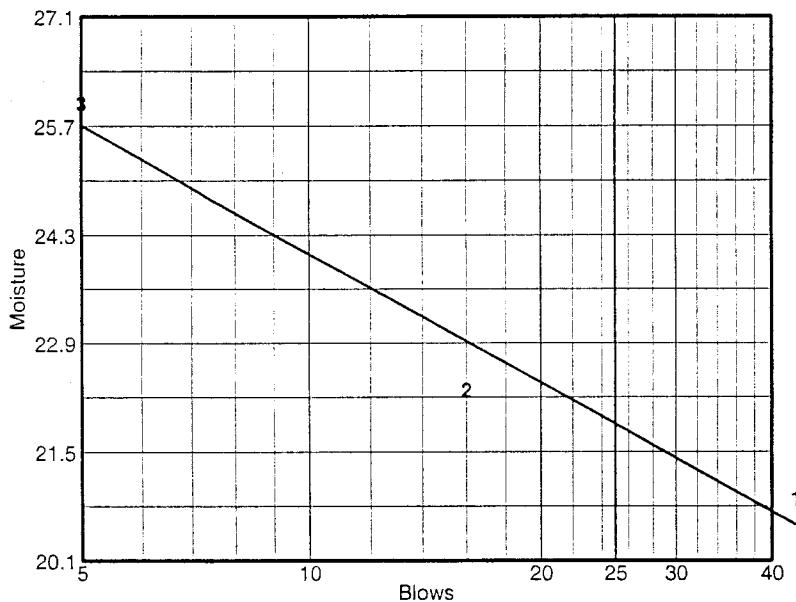
USCS Class.: SC

AASHTO Class.: A-4(1)

Testing Remarks: Sample #1RA17606PR sampled May 14th, 2003. Borehole #6 South.
 Lab Log #029

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.39	28.00	25.77			
Dry+Tare	23.75	24.92	22.74			
Tare	11.12	11.10	11.09			
# Blows	43	16	5			
Moisture	20.9	22.3	26.0			



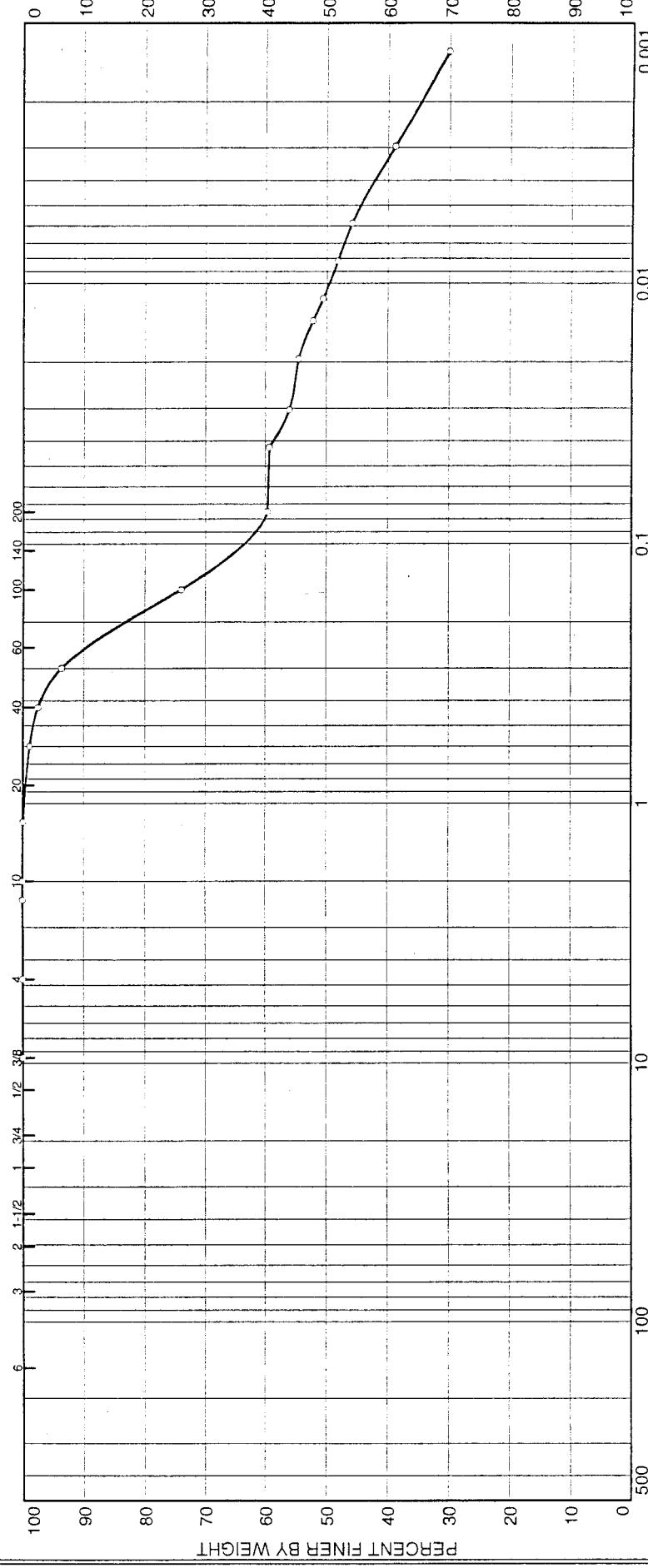
Liquid Limit= 21.9
 Plastic Limit= 13.8
 Plasticity Index= 8.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	10.13	10.31		
Dry+Tare	9.44	9.58		
Tare	4.33	4.36		
Moisture	13.5	14.0		

PARTICLE SIZE DISTRIBUTION TEST REPORT

U.S. SIEVE OPENING IN INCHES



% GRAVEL % COARSE % FINE % MEDIUM % FINE % SILT % CLAY

% + 3"	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	2.6	37.8	15.1	44.5

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D&D TSF 06-26 soils		20.0' - 21.5'	6/10/03	CL	Sandy lean clay	18.3%	26.7	14.2

○ Sample #1RA17607PR sampled May 14th, 2003. Borehole
#7 South.

Lab Log #030

INEEL MATERIALS LAB

Project No. Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17607PR

Elev. or Depth: 20.0' - 21.5'

Sample Length (in./cm.): LL #030

Location:

Description: Sandy lean clay

Date: 6/10/03

Natural Moisture: 18.3%

Liquid Limit: 26.7

Plastic Limit: 14.2

USCS Class.: CL

Testing Remarks: Sample #1RA17607PR sampled May 14th, 2003. Borehole #7 South.

Lab Log #030

Mechanical Analysis Data

Initial

Dry sample and tare= 381.83

Tare = 106.14

Dry sample weight = 275.69

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
3/8 inch	0.00	0.00	100.0
# 4	0.00	0.00	100.0
# 8	0.00	0.00	100.0
# 10	0.00	0.00	100.0
# 16	0.21	0.00	99.9
# 30	3.06	0.00	98.8
# 40	3.78	0.00	97.4
# 50	10.65	0.00	93.6
# 100	53.91	0.00	74.0
# 200	39.85	0.00	59.6

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 100.0

Weight of hydrometer sample: 67.33

Hygroscopic moisture correction:

Moist weight & tare = 387.47

Dry weight & tare = 381.83

Tare = 106.14

Hygroscopic moisture= 2.0 %

Calculated biased weight= 65.98

Automatic temperature correction

Composite correction at 20 deg C = -4.0

Meniscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	41.0	37.7	0.0138	42.0	9.4	0.0423	59.3
2.00	23.0	39.0	35.7	0.0138	40.0	9.7	0.0304	56.1
5.00	23.0	38.0	34.7	0.0138	39.0	9.9	0.0194	54.5
10.00	23.0	36.5	33.2	0.0138	37.5	10.1	0.0139	52.2
15.00	23.0	35.5	32.2	0.0138	36.5	10.3	0.0114	50.6
30.00	23.0	34.0	30.7	0.0138	35.0	10.6	0.0082	48.2
60.00	23.0	32.5	29.2	0.0138	33.5	10.8	0.0059	45.9
250.00	23.0	28.0	24.7	0.0138	29.0	11.5	0.0030	38.8
1440.00	23.0	22.5	19.2	0.0138	23.5	12.4	0.0013	30.1

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

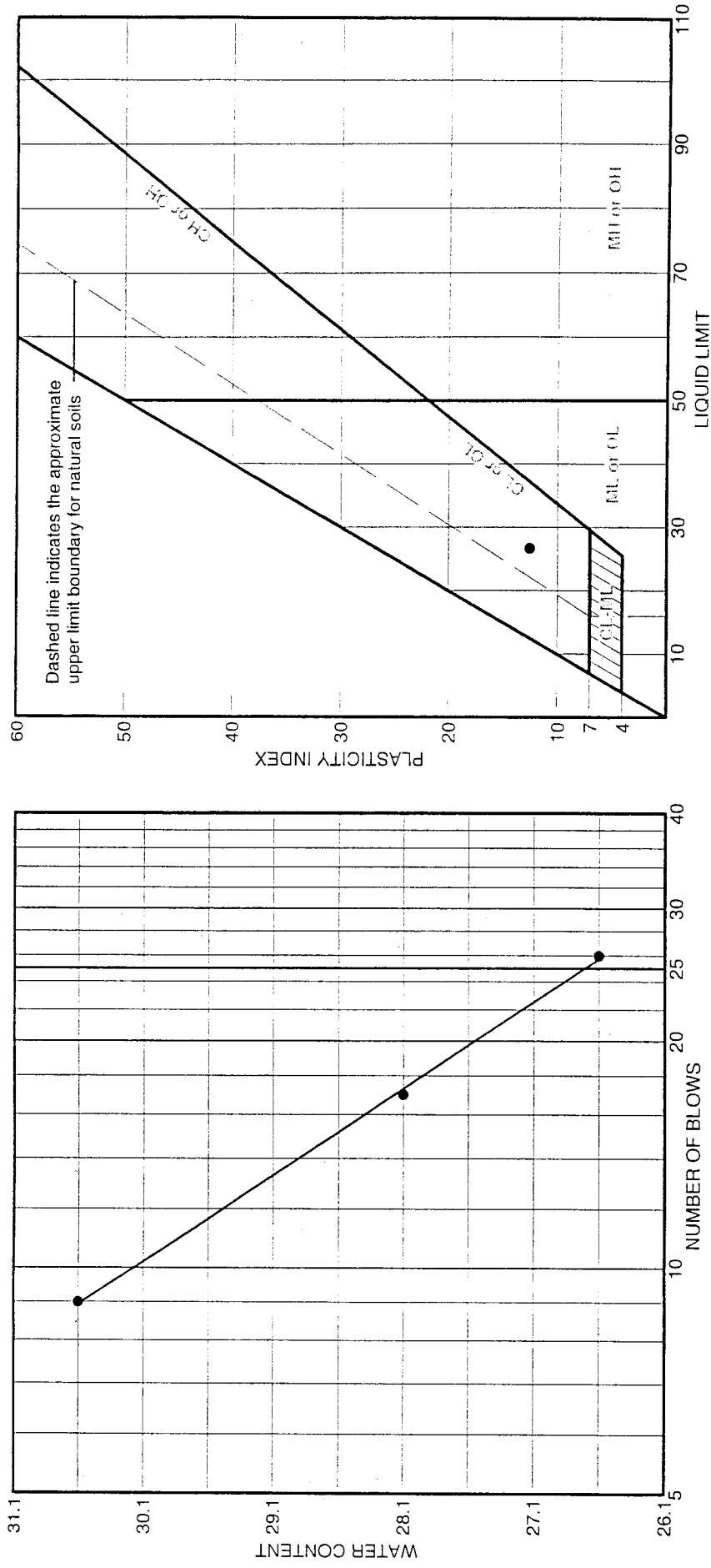
% + 3" = % GRAVEL =

% SAND = 40.4 (% coarse = 0.0 % medium = 2.6 % fine = 37.8)

% SILT = 15.1 % CLAY = 44.5

D₈₅= 0.21 D₆₀= 0.08 D₅₀= 0.01

LIQUID AND PLASTIC LIMITS TEST REPORT



- Sample #1RA17607PR sampled May 14th, 2003. Borehole #7 South.

Lab Log #030

INEEL MATERIALS LAB

Client
Project

LIQUID AND PLASTIC LIMIT TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17607PR

Elev. or Depth: 20.0' - 21.5'

Sample Length (in./cm.): LL #030

Location:

Description: Sandy lean clay

Date: 6/10/03 **Natural Moisture:** 18.3%

USCS Class.: CL

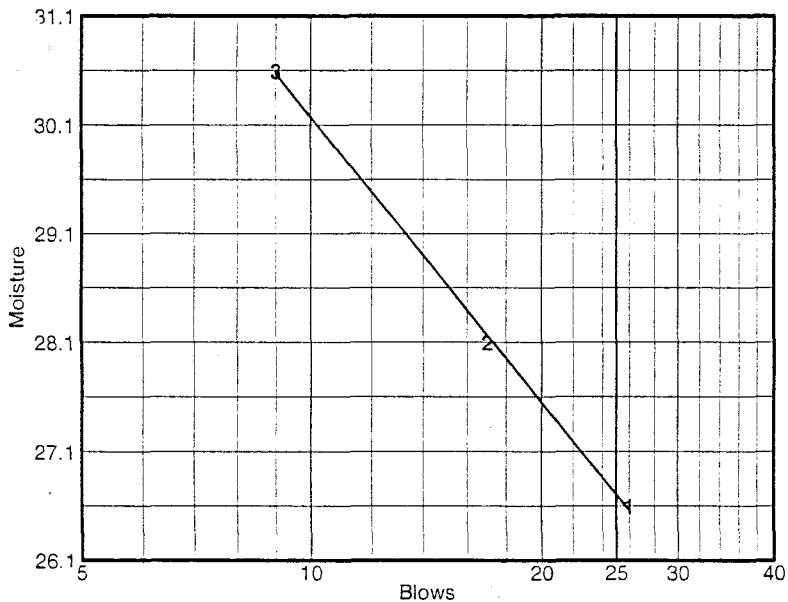
AASHTO Class.: A-6(5)

Testing Remarks: Sample #1RA17607PR sampled May 14th, 2003. Borehole #7 South.

Lab Log #030

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.40	25.20	26.66			
Dry+Tare	22.40	22.11	23.02			
Tare	11.13	11.13	11.14			
# Blows	26	17	9			
Moisture	26.6	28.1	30.6			

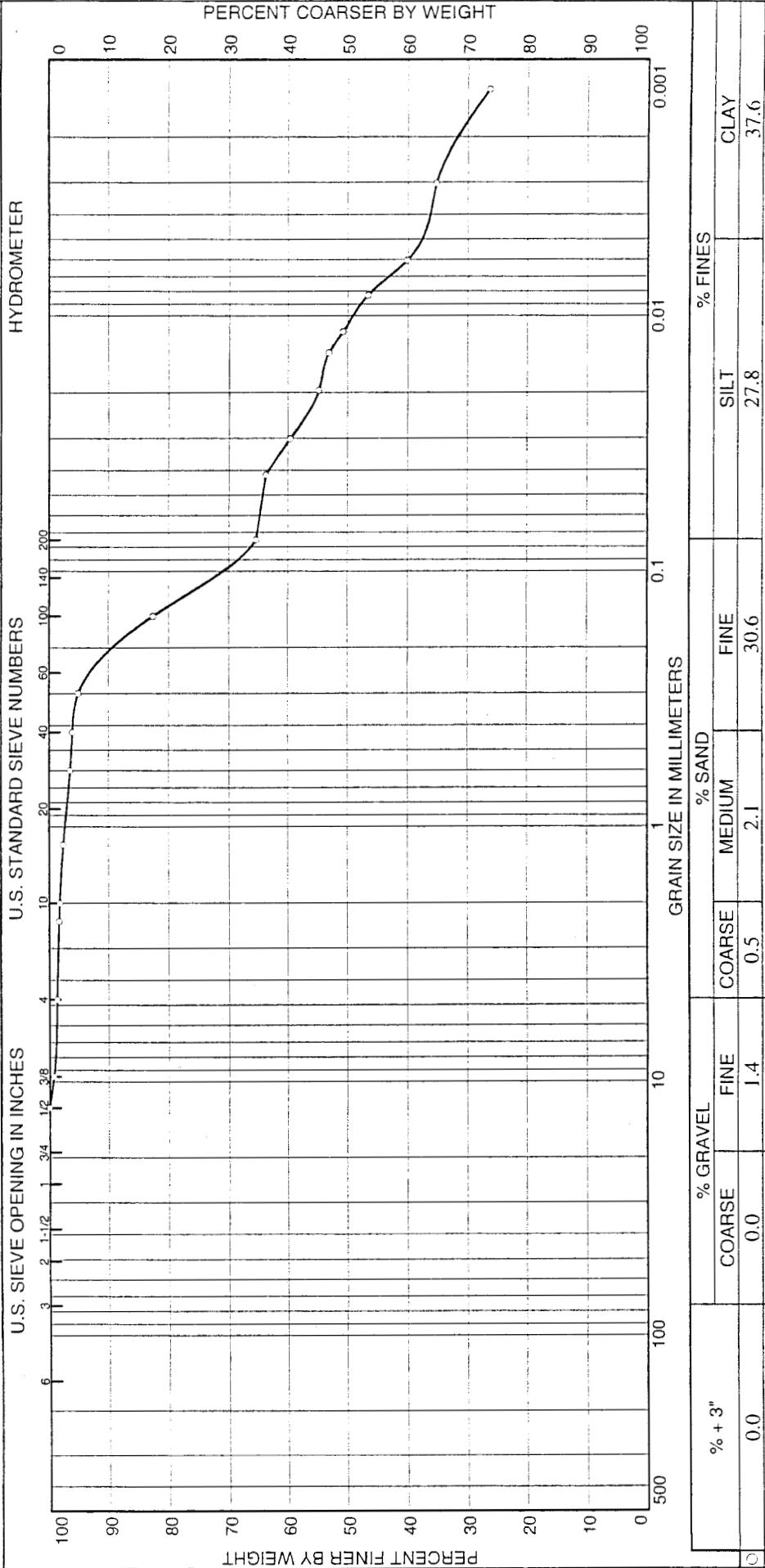


Liquid Limit= 26.7
Plastic Limit= 14.2
Plasticity Index= 12.5

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	9.50	8.54		
Dry+Tare	8.85	8.02		
Tare	4.32	4.34		
Moisture	14.3	14.1		

PARTICLE SIZE DISTRIBUTION TEST REPORT



c) Sample #1RA17608PR sampled May 14th, 2003. Borehole #8 South.

Lab Log #031

INEEL MATERIALS LAB

Plate

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project:
Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17608PR

Elev. or Depth: 23.0' - 24.5'

Sample Length (in./cm.): LL #031

Location:

Description: Sandy lean clay

Date: 6/10/03

Natural Moisture: 20.5%

Liquid Limit: 28.9

Plastic Limit: 15.6

USCS Class.: CL

Testing Remarks: Sample #1RA17608PR sampled May 14th, 2003. Borehole #8 South.

Lab Log #031

Mechanical Analysis Data

Initial

Dry sample and tare= 361.02

Tare = 105.69

Dry sample weight = 255.33

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
1/2 inch	0.00	0.00	100.0
3/8 inch	2.00	0.00	99.2
4	1.69	0.00	98.6
# 8	0.85	0.00	98.2
# 10	0.26	0.00	98.1
# 16	1.58	0.00	97.5
# 30	2.93	0.00	96.4
# 40	0.99	0.00	96.0
# 50	2.42	0.00	95.0
# 100	32.05	0.00	82.5
# 200	43.48	0.00	65.4

Hydrometer Analysis Data

Separation sieve is #10

Percent -#10 based upon complete sample= 98.1

Weight of hydrometer sample: 64.46

Hygroscopic moisture correction:

Moist weight & tare = 368.59

Dry weight & tare = 361.02

Tare = 105.69

Hygroscopic moisture= 3.0 %

Calculated biased weight= 63.82

Automatic temperature correction

Composite correction at 20 deg C = -4.0

M iscus correction only= 1.0

Specific gravity of solids= 2.50

Specific gravity correction factor= 1.038

Hydrometer type: 152H

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	23.0	42.5	39.2	0.0138	43.5	9.2	0.0418	63.7
2.00	23.0	40.0	36.7	0.0138	41.0	9.6	0.0302	59.6
5.00	23.0	37.0	33.7	0.0138	38.0	10.1	0.0196	54.8
10.00	23.0	36.0	32.7	0.0138	37.0	10.2	0.0140	53.1
15.00	23.0	34.5	31.2	0.0138	35.5	10.5	0.0115	50.7
30.00	23.0	32.0	28.7	0.0138	33.0	10.9	0.0083	46.6
60.00	23.0	28.0	24.7	0.0138	29.0	11.5	0.0060	40.1
250.00	23.0	25.0	21.7	0.0138	26.0	12.0	0.0030	35.2
1440.00	23.0	19.5	16.2	0.0138	20.5	12.9	0.0013	26.3

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" = % GRAVEL = 1.4 (% coarse = % fine = 1.4)

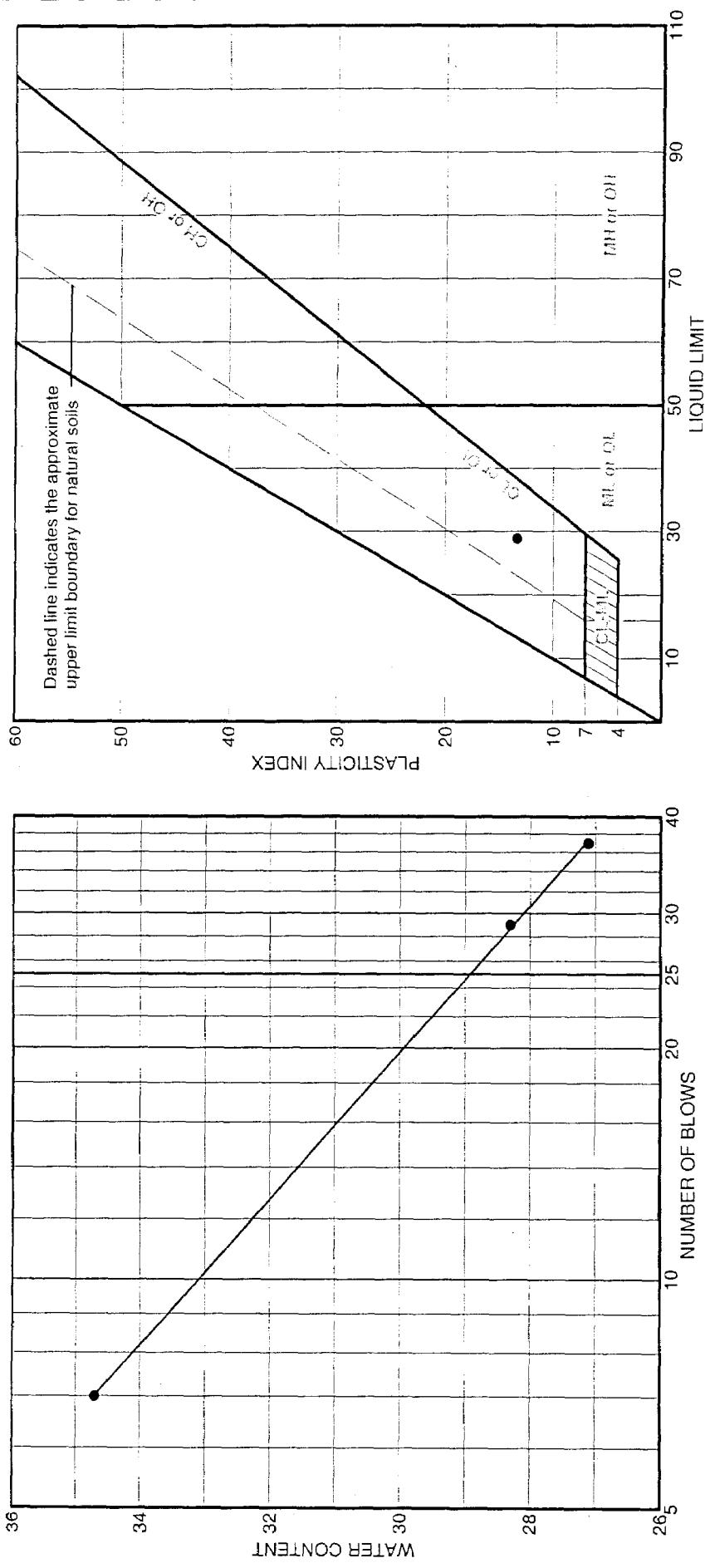
% SAND = 33.2 (% coarse = 0.5 % medium = 2.1 % fine = 30.6)

% SILT = 27.8 % CLAY = 37.6

D₈₅= 0.16 D₆₀= 0.03 D₅₀= 0.01

D₃₀= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT



● Sample #IR17608PR sampled May 14th, 2003. Borehole #8 South. Lab Log #031

INEEL MATERIALS LAB

Project No. _____ Plate _____

LIQUID AND PLASTIC LIMIT TEST DATA

Client:

Project:

Project Number:

Sample Data

Source: D&D TSF 06-26 soils

Sample No.: 1RA17608PR

Elev. or Depth: 23.0' - 24.5'

Sample Length (in./cm.): LL #031

Location:

Description: Sandy lean clay

Date: 6/10/03 **Natural Moisture:** 20.5%

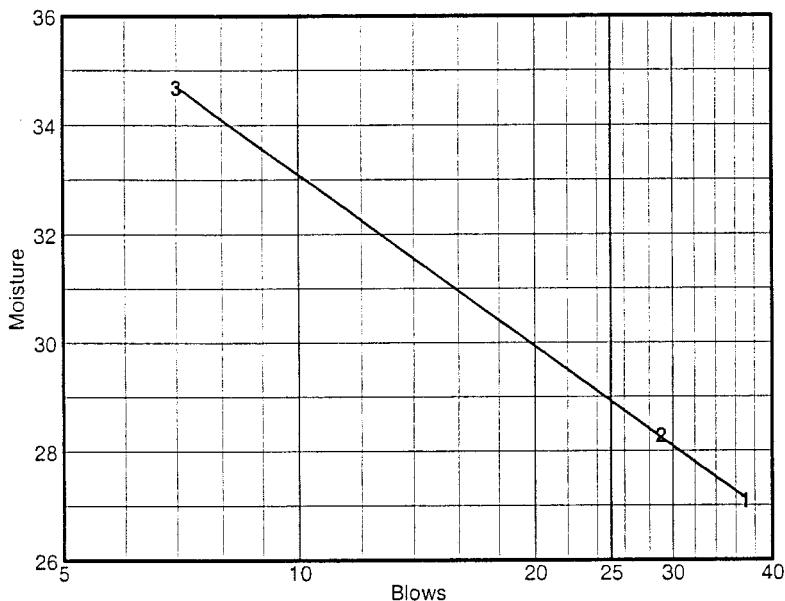
USCS Class.: CL

AASHTO Class.: A-6(6)

Testing Remarks: Sample #1RA17608PR sampled May 14th, 2003. Borehole #8 South.
Lab Log #031

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	62.16	66.66	65.21			
Dry+Tare	58.45	62.63	60.67			
Tare	44.77	48.37	47.58			
# Blows	37	29	7			
Moisture	27.1	28.3	34.7			



Liquid Limit= 28.9
Plastic Limit= 15.6
Plasticity Index= 13.3

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	21.16	22.25		
Dry+Tare	20.51	21.60		
Tare	16.38	17.40		
Moisture	15.7	15.5		